ATTACHMENT 26

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

IN RE: DA VINCI SURGICAL ROBOT ANTITRUST LITIGATION	Lead Case No. 3:21-cv-03825-VC

CORRECTED EXPERT REPORT OF PROFESSOR EINER ELHAUGE

January 10, 2023

WITH ERRATA INCORPORATED

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INTRODUCTION AND ASSIGNMENT

1. Defendant Intuitive Surgical, Inc. (hereinafter "Intuitive") sells a product for robotic surgery known as the "da Vinci." The da Vinci can be used to perform "minimally invasive soft-tissue" ("MIST") surgery.[1] Intuitive provides servicing for the da Vinci, including preventative care/maintenance and repairs. Intuitive also sells a variety of instruments and accessories for use with the da Vinci, including those known as "EndoWrists."

2. Third-party independent repair companies ("IRCs") unaffiliated with Intuitive have attempted to provide EndoWrist repair services, which include sharpening and aligning instrument heads, as well as resetting the use counter, which otherwise would limit the number of EndoWrist uses.[2] The IRCs include Surgical Instrument Service Company (hereinafter "SIS"), Restore Robotics (hereinafter "Restore"), and Rebotix Repair (hereinafter "Rebotix"). Restore also has attempted to provide service for the da Vinci itself.

3. However, Intuitive has allegedly instituted and enforced restraints that a) prohibit da Vinci buyers and lessees from using IRCs to service the da Vinci or to repair EndoWrists, b) require da Vinci buyers and lessees to buy replacement EndoWrists from Intuitive instead of allowing them to be repaired, and c) artificially suppress the number of times a buyer/lessee can use an EndoWrist.[3] Intuitive

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[1] Part I *infra* has a detailed discussion of robotic surgery and Intuitive's da Vinci; this introduction is simply a high-level summary of that information.

[2] Intuitive has installed use counters in "EndoWrists" that prevent them from being used more than a fixed number of times, as set by Intuitive. This use limit can vary by EndoWrist type and by time period.

[3] *See* Consolidated Amended Class Action Complaint in *In Re: Da Vinci Surgical Robot Antitrust Litigation*, Case 3:21-cv-03825-VC (N.D. Cal. 09/10/21) (hereinafter "CAC"), at ¶ 3 ("Intuitive conditions the purchase or lease of a da Vinci on acceptance of Intuitive's service contract. The service contract requires the purchaser to use Intuitive as the sole service provider for all da Vincis and prohibits the purchaser from either servicing the robot itself or hiring an independent repair company ('IRC') to service the da Vinci."); *id.* ¶ 4 ("Intuitive also ties the purchase or lease of a da Vinci to the purchase of replacement EndoWrists from Intuitive. Both contractually and technologically, Intuitive restricts the number of times a purchaser may use the EndoWrists, in most cases to a mere ten uses—without any medical justification. The sole purpose of artificially suppressing the number of EndoWrist uses is to artificially inflate the number of EndoWrists hospitals must purchase to perform life-saving surgeries. Moreover, according to the terms of the

allegedly enforces these restraints, including by refusing to provide da Vinci parts and refusing to perform necessary services not offered by third parties.[4] The three IRCs listed above have all sued Intuitive, alleging that Intuitive's alleged restraints against third-party repair and servicing, and requiring the purchase of replacements are anticompetitive and violate antitrust laws.[5]

4. The three Named Plaintiffs and a proposed class of hospitals, trauma centers, and/or clinics (collectively, "Plaintiffs") have also sued Intuitive, challenging its alleged restraints on rival da Vinci servicing, EndoWrist repair and replacement, and EndoWrist usage.[6] The proposed class consists of "all entities that purchased da Vinci service and/or EndoWrists from Intuitive in the United States at any time from May 21, 2017 to the present" (hereinafter "the Class").[7] There are three Named Plaintiffs: Larkin Community Hospital ("Larkin"), Franciscan Alliance, Inc. ("Franciscan"), and King County Public Hospital District No. 1 (DBA Valley Medical Center) ("Valley").[8] Plaintiffs allege that the restraints on rival da Vinci servicing, rival EndoWrist repair and replacement, and EndoWrist usage are anticompetitive and constitute tying, exclusive dealing, and illegal monopolization.[9]

5. Plaintiffs' counsel has asked me to evaluate the economic evidence in this case and opine on the following issues during the Class Period, which is defined as "any time from May 21, 2017 to the present".[10]

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agreements Intuitive requires for the purchase or lease of the da Vinci ('Sales Agreements'), hospitals cannot hire IRCs to service or repair their EndoWrists (e.g., clean or sharpen them for longer use)."

[4] CAC ¶¶ 75-89.

[5] *See* "Order" in *Rebotix Repair v. Intuitive Surgical*, Case 8:20-cv-02274-VMC-TGW (M.D. Fl. 03/08/21) [REBOTIX165908-937]; "Order Denying Motion to Dismiss" in *Restore Robotics v. Intuitive Surgical*, Case 5:19-cv-00055-TKW-MJF (N.D. Fl. 09/16/19); "Order Granting In Part And Denying In Part Motion To Dismiss" in *Surgical Instrument Service Company v. Intuitive Surgical*, Case 3:21-cv-03496-VC (N.D. Cal. 11/23/21).

[6] CAC ¶¶ 3-4. Hereinafter, I will for brevity refer to hospitals, trauma centers, and/or clinics collectively as simply "hospitals."

[7] CAC ¶ 163.

[8] CAC at p.1 (preamble). A fourth Named Plaintiff, Kaleida Health, was included in the CAC, but has since been voluntarily dismissed as a Named Plaintiff. "Notice of Voluntary Dismissal of Plaintiff Kaleida Health" in *In Re: Da Vinci Surgical Robot Antitrust Litig.*, Case 3:21-cv-03825-VC (N.D. Cal. Jan. 14, 2022).

[9] CAC ¶¶ 173-197.

[10] CAC ¶ 163.

A. What markets are relevant to assessing Intuitive's allegedly anticompetitive restraints? (This includes, but is not limited to, determining the relevant markets for each of the following: (1) the da Vinci robot, (2) EndoWrist repair and replacement, and (3) da Vinci service.)

B. Did Intuitive have market power and monopoly power in those relevant markets?

C. Did Intuitive's restraints have exclusionary effects on rival da Vinci servicing and rival EndoWrist repair and replacement?

D. If Intuitive's restraints excluded competitors, did such exclusion cause Plaintiffs to suffer anticompetitive effects when compared to a but-for world where Intuitive did not impose such exclusionary restraints?

E. Did Intuitive's restraints have procompetitive effects that could not have been achieved by substantially less restrictive alternatives, and that were large enough and passed through to consumers enough to offset any anticompetitive effects?

F. How much less would Plaintiffs have paid for the products and services at issue in a but-for world without Intuitive's exclusionary restraints?

QUALIFICATIONS

6. I am the Petrie Professor of Law at Harvard University, where I teach and write about the economic analysis of antitrust law, health policy, and various other subjects. I am the author of various books, including *U.S. Antitrust Law & Economics*; co-author of *Global Antitrust Law & Economics*, *Global Competition Law & Economics*, and *Areeda, Elhauge & Hovenkamp, Vol X, Antitrust Law*; and editor of *The Research Handbook on the Economics of Antitrust Law* and *The Fragmentation of U.S. Health Care*. I am also the author of numerous articles on various topics involving the economic analysis of antitrust and other legal issues, including articles on monopolization and exclusionary agreements. My CV (attached as Exhibit A) lists all my publications, including all those in the past ten years. Exhibit B to this report describes my compensation and the cases in which I have testified as an expert in a trial or deposition in the past four years. I am being compensated at a rate of $1300 per hour for my work on this case, and my consulting

firm, Legal Economics LLC, is being compensated $245-745 per hour for the work of my staff on this report. None of my compensation in this case is contingent upon the outcome of the case or any aspect of the case.

7. I am also President of Legal Economics, LLC, which provides expert witnesses and support work on legal cases. I have testified as an expert witness on antitrust economics in dozens of federal cases. I have been qualified as an expert in antitrust economics in all twenty-one court opinions that addressed that question, and my economic and econometric methodologies have been repeatedly sustained and found reliable. I also have served as an expert witness on antitrust economics before Congress, arbitration panels, and competition agencies in the U.S., the EC, Korea, and Brazil. My testimony as an economics expert has spanned a wide range of topics, including reverse-payment settlements, other horizontal agreements, vertical agreements, mergers, monopolization and exclusionary conduct, price discrimination, health economics, patent economics, and contract economics. My clients have included leading corporations, law firms, and the United States government. I have been named one of the world's leading competition economists in the *International Who's Who of Competition Lawyers and Economists*.

8. I am a Member of Advisory Boards for the Journal of Competition Law & Economics, the Social Sciences Research Network on Antitrust Law & Policy, and the Social Sciences Research Network on Telecommunications & Regulated Industries. I have taken courses in economics, statistics, antitrust, and economic analysis of law, and I regularly read and use economic literature on antitrust economics, including books on industrial organization. I also regularly attend workshops on those and other topics regarding the economic analysis of law. I routinely use and teach economic analysis in my classes, including those that I regularly offer on antitrust law and economics.

EXECUTIVE SUMMARY

9. Pursuant to my assignment regarding defining the relevant markets, I conclude that:

- Intuitive's da Vinci is in the market for Minimally Invasive Soft Tissue ("MIST") surgery robots.
- EndoWrist repair and replacement is a relevant market.
- Da Vinci servicing is a relevant market.

10. Pursuant to my assignment regarding the existence of market and/or monopoly power and whether the restraints' effects were exclusionary, anticompetitive and/or procompetitive, I conclude that:

- Intuitive has both market power and monopoly power in the market for MIST surgery robots.
- Intuitive has both market power and monopoly power in the market for EndoWrist repair and replacement.
- Intuitive's restraints anticompetitively excluded rivals in a way that acquired, enhanced, and maintained monopoly power for Intuitive in the market for EndoWrist repair and replacement.
- Intuitive has both market power and monopoly power in the market for da Vinci service.
- Intuitive's restraints anticompetitively excluded rivals in a way that acquired, enhanced, and maintained monopoly power for Intuitive in the market for da Vinci service.
- Intuitive's restraints had anticompetitive effects on Plaintiffs that were not offset by any procompetitive efficiencies.

11. Pursuant to my assignment regarding Plaintiffs' damages, I find the following range for damages, where the range depends on the but-for date for rival entry that is found by the trier of fact:

- Plaintiff Franciscan was damaged by $4.3 million to $5.5 million on purchases of EndoWrists and by $1.4 million to $2.0 million on purchases of da Vinci servicing.
- Plaintiff Larkin was damaged by $425,000 to $929,000 on purchases of EndoWrists and by $66,000 to $103,000 on purchases of da Vinci servicing.
- Plaintiff Valley was damaged by $1.3 million to $1.5 million on purchases of EndoWrists and by $281,000 to $352,000 on purchases of da Vinci servicing.
- The entire proposed class was damaged by $1.75 billion to $2.27 billion on purchases of EndoWrists and by $350 million to $494 million on purchases of da Vinci servicing.

These damage figures are calculated through the end of when data on purchases is available, which is December 31, 2021, but damages are ongoing and damages past the end of 2021 will either be calculated when data past 2021 becomes available or extrapolated from the existing data if no more data becomes available. My analysis in this report is based on my review of information available to date, including

Intuitive's partial answers to data questions. Should more or different data and/or information be forthcoming, I reserve the option to supplement my analysis.

I. INDUSTRY BACKGROUND

12. This case concerns products and services used to perform robot-assisted MIST surgery. This section provides background information to help the reader better understand the history and evolution of this specialized type of surgery, and how the products and services fit into this specialty.

A. A Brief History of Surgical Methods

13. There are two general surgery types: open surgery and minimally invasive surgery.[11] Open surgery is a method where the skin and tissue is cut open "so that the surgeon has a full view of the structures or organs involved."[12] In contrast, minimally invasive surgery "use[s] no incision or small incisions, which means a patient will have less scarring and loss of blood than [from] an open procedure."[13] "[M]any surgeons have come to prefer it [minimally invasive surgery] to traditional (open) surgery, which requires larger incisions and, usually, a longer hospital stay."[14]

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[11] Stanford Health Care, "General Surgery Types," available at https://stanfordhealthcare.org/medical-treatments/g/general-surgery/types.html (accessed 7/22/2022).

[12] Stanford Health Care, "General Surgery Types," available at https://stanfordhealthcare.org/medical-treatments/g/general-surgery/types.html (accessed 7/22/2022). *See also*, John Francis 10/14/2022 Dep., *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 9:18-22 ("Q. What is open surgery? A. Open surgery is where you make an incision large enough to see it – see the inside of a wound visually with your own eyes without the assistance of other mechanisms such as a camera.").

[13] Loyola Medicine, "Minimally Invasive Surgery," available at https://www.loyolamedicine.org/find-a-condition-or-service/surgical-services/minimally-invasive-surgery (accessed 7/22/2022); see also, Johns Hopkins Medicine, "Methods of Surgery," available at https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/methods-of-surgery (accessed 7/22/2022), Stanford Health Care, "General Surgery Types," available at https://stanfordhealthcare.org/medical-treatments/g/general-surgery/types.html (accessed 7/22/2022).

[14] Mayo Clinic, *Minimally Invasive Surgery*, https://www.mayoclinic.org/tests-procedures/minimally-invasive-surgery/about/pac-20384771 (accessed 8/3/2022).

14. While there are many types of minimally invasive surgery, the most common is laparoscopy.[15] Laparoscopic surgery involves the use of small abdominal incisions. "[I]n this approach, surgeons make one or more small incisions in the abdomen and conduct surgery with tiny surgical tools, a digital camera with a light and long fiber optic cable. The laparoscope sends digital video to a monitor, which the surgeon uses as a guide during the operation."[16]

15. Laparoscopic surgery has the "obvious benefits of avoiding the need for large abdominal incisions, less surgical trauma, less operative morbidity, more rapid and smooth postoperative recovery, and high acceptance on the part of patients who began to demand the technology."[17] The rapid adoption of this new technique was described as follows:

> "In the early 1990s, literally overnight endoscopic surgery was welcomed by widespread acceptance and rapid dissemination. This 'laparoscopic revolution' was triggered by a sudden demand from patients, and its popularity heightened by avid media interest."[18]

16. However, there were still limitations to what laparoscopic surgeries could do. As a 2004 article noted, "[i]nherent in current laparoscopic equipment is a loss of haptic feedback (force and tactile), natural hand-eye coordination, and dexterity…These limitations make more delicate dissections and anastomoses

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[15] Loyola Medicine, "Minimally Invasive Surgery," available at https://www.loyolamedicine.org/find-a-condition-or-service/surgical-services/minimally-invasive-surgery (accessed 7/22/2022) ("The most common minimally invasive technique is a laparoscopy").

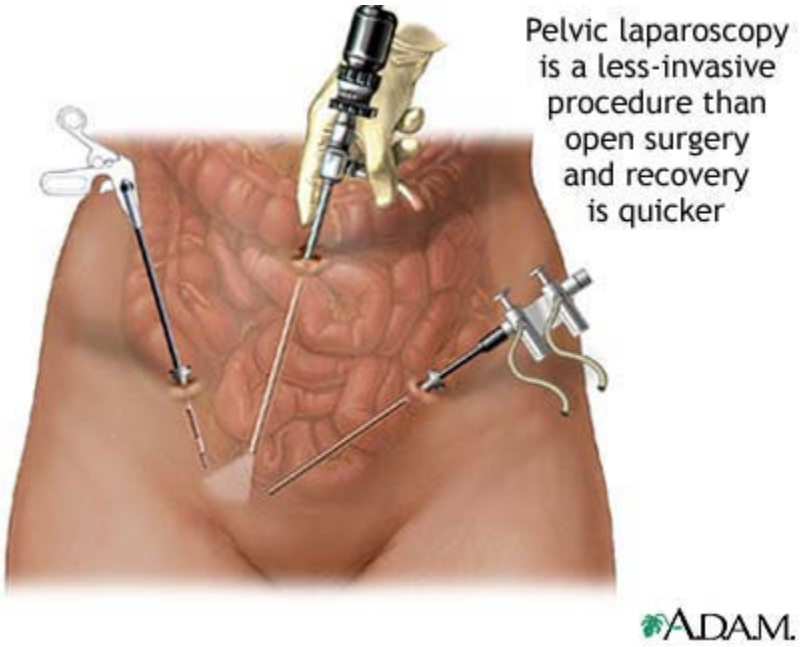
[16] Loyola Medicine, "Minimally Invasive Surgery," available at https://www.loyolamedicine.org/find-a-condition-or-service/surgical-services/minimally-invasive-surgery (accessed 7/22/2022). *See also*, Francis Dep. at 9:4-14 ("Q. What is laparoscopic surgery? A. Laparoscopic surgery is an operation where you perform it with a camera, you make incisions to put the camera inside the abdomen, and you may make further incisions and use trocars, which are small cannulas, which enter the abdominal cavity through which you put instruments, and you use those instruments for manipulation, for sewing, elsewhere. But the main idea is that you're using a camera to access the intraabdominal cavity in order to visualize what you're doing inside.").

[17] *Introduction*, *in* BARIATRIC ROBOTIC SURGERY: A COMPREHENSIVE GUIDE vii (Carlos Eduardo Domene et al., eds., 2019) (hereinafter "Domene et al. (2019)").

[18] Ibraham Alkatout, et al., *The Development of Laparoscopy—A Historical Overview*, FRONTIERS IN SURGERY 8 (2021), Article 799442, at 7 (hereinafter "Alkatout et al. (2021)"). *See also*, Myriam Curet 5/7/2021 Dep. (Intuitive) at 8, *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.); Anthony R. Lanfranco, et al. *Robotic Surgery: A Current Perspective*, ANNALS OF SURGERY, Vol. 239(1), 2004 at 14 (hereinafter "Lanfranco et al. (2004)").

difficult if not impossible."[19] These limitations are due to the "simple technical interface between the patient and the surgeon."[20] One limitation of this interface is due to the design of laparoscopic instruments, which are referred to as "straight sticks."[21] See Figure 1 below.

Figure 1: Examples of Laparoscopic Instruments In Use[22]



[19] Lanfranco, et al. (2004), at 15.

[20] F. Pugin et al., *History of robotic surgery: From AESOP and ZEUS to da Vinci*, JOURNAL OF VISCERAL SURGERY, 2011, Vol. 148, e3-e8 (hereinafter "Pugin et al. (2011)") at e3.

[21] Expert Report of Dr. John Bomalaski, July 26, 2021, *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.) (hereinafter "Bomalaski (Rebotix) Report") ¶¶ 18, 23; Eugene Dickens 5/27/21 Dep., *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 12:9-13:23. See also, Pugin et al. (2011) at e3 ("…the instruments used have only four degrees of freedom with a fixed entry point. This creates a lever arm effect that only amplifies the amplitude of the movements, decreasing the precision of the surgeon's motions and accentuating any hand tremor.").

[22] Source: Medline Plus (a service of the U.S. National Library of Medicine, National Institutes of Health), "Pelvic laparoscopy," available at https://medlineplus.gov/ency/imagepages/1109.htm (accessed 10/6/2022).

17. Robotic surgery was developed as the next surgical "revolution" or "step" after laparoscopy.[23] Robotic surgery was developed to "overcome the limitations of current laparoscopic technologies" and "has already proven itself to be of great value, particularly in areas inaccessible to conventional laparoscopic procedures."[24] As a result, surgical robots are able to perform "procedures that might otherwise be difficult with traditional open or laparoscopic techniques."[25]

18. Reflecting these advances, there are now specialized associations and publications for surgical robots and robotic surgery. This was confirmed by Todd Pope, CEO of surgical robot manufacturer TransEnterix, who testified that there are "separate trade associations and professional associations for surgical robots and robotic surgery."[26] For example, one such professional association is the Society of Robotic Surgery.[27] Another, the Society of American Gastrointestinal and Endoscopic Surgery ("SAGES"), has a committee dedicated to robotics.[28] There are also specialized academic journals focused on robotic surgery, such as the Journal of Robotic Surgery.[29]

19. Many people in the industry use the analogy of laparoscopy being like a bicycle while robotics is like a Tesla—both are forms of transportation, but one is

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[23] Curet (in *Restore*) Dep. at 8:16-20. *See also*, Candi Helseth, *Technology Widens Care Options for Rural Hospitals*, THE RURAL MONITOR, February 12, 2014 (hereinafter "Helseth (2014)") ("'Robotics takes the minimally invasive world one step further,' commented Dr. Hal Leland, an Essentia Health obstetrician/gynecologist who performs robotic surgery."); William E. Kelley Jr, *The Evolution of Laparoscopy and the Revolution in Surgery in the Decade of the 1990s*, JOURNAL OF THE SOCIETY OF LAPAROENDOSCOPIC SURGEONS, 2008 (hereinafter "Kelley (2008)"), at 355 ("Robotic surgery is considered by many to be one of the next evolutions in minimally invasive surgery."); Ricardo Estape 10/22/2022 Dep. (Larkin), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 63:19-21 ("Q. Do you agree that robotic surgery has revolutionized minimally invasive surgery? A. Yes, sir.").

[24] Lanfranco, et al. (2004) at 15, 20.

[25] FRANCISCAN-00051653-657 at 653. See also, Kelley (2008), at 355 ("The most critical value of robotic technology lies in its enabling capabilities, allowing surgeons to perform complex tasks that would exceed their abilities with traditional laparoscopic instruments.")

[26] Todd Pope 4/30/2021 Dep. (Intuitive), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 11:6-10, 35:7-17.

[27] Pope (in *Restore*) Dep. at 35:7-13.

[28] SAGES, *Committee Descriptions*, https://www.sages.org/leadership/committees/committee-descriptions/ (accessed 9/16/2022).

[29] Springer, *Journal of Robotic Surgery: Aims and scope*, https://www.springer.com/journal/11701/aims-and-scope (accessed 9/16/2022).

much more feature-rich.[30] For example, Intuitive "admits that the da Vinci may provide surgeons using the system with enhanced visualization, dexterity, precision, that the da Vinci has more 'arms' than a human and that it may minimize surgeon fatigue."[31]

20. Robotic surgery provides benefits to both the surgeon and the patient. Benefits to the patient include more precise surgery, less pain, less risk of infection and less blood loss, earlier discharge from the hospital, less scarring and shorter recovery, and, in many cases, better clinical outcomes.[32] Benefits to the surgeon include better ergonomics, an enhanced visual field, superior dexterity, and access to hard-to-reach places.[33] Many of these benefits are tied to the instruments, which don't have to be "straight and rigid" like the "'straight sticks'" used in traditional laparoscopy.[34]

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[30] Pope (in *Restore*) Dep., at 98:18-99:5 ("Q. Mr. Pope, do you have any analogy for explaining the difference between laparoscopic technology and surgical robotic technology? A. Well, many of us in the industry always use the same analogy that it's like transportation. You can get to the corner on a bicycle or you can get to the corner on a Tesla. They both are modes of transportation. And that's the way we used to describe laparoscopy as the bicycle and Tesla as the robotics. Robotics is high-tech, you know, very feature-rich product. I mean, that's – I didn't come up with that, but many of us described it that way."). *See also*, Estape (in *In re: da Vinci*) Dep. at 63:22-64:6.

[31] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, 1/18/2022, ¶ 27.

[32] MedStar Health, *Robotic Surgery*, https://www.medstarhealth.org/services/robotic-surgery (accessed 8/5/2022). *See also*, Bomalaski (in *Rebotix*) Report, ¶ 41; Curet (in *Restore*) Dep. at 10:1-17; Intuitive-00128685; Francis (in *In re: da Vinci*) Dep. at 11:7-25 ("Q. When you first began using the da Vinci system, were you skeptical about the system, or what were you – what was your perspective on it? A. Yes. I was trained in open surgeries and laparoscopy, and I did not initially see any value to adding an interface like robotics. Once I started using it and realized that there was dual vision that you could use versus a single eye, the three-dimensional aspects was quite a bit – I would say it got easier to assess tissue and perform certain procedures. In addition to that, I found that less trauma to the patient occurred because you were touching fewer amounts of tissue, and as a result, the patients recovered quicker with less pain. And initially, I was skeptical of that, but after performing several different types of procedures, realized that that actually was true for a majority, if not all of the patients.").

[33] MedStar Health, *Robotic Surgery*, https://www.medstarhealth.org/services/robotic-surgery (accessed 8/5/2022); Expert Report of Dr. John Bomalaski, August 20, 2021, *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), (hereinafter "Bomalaski (in *Restore*) Report"), ¶¶ 31-40. Bomalaski (Rebotix) Report, ¶ 23; Curet (in *Restore*) Dep. at 11:2-16; Intuitive-00463328-403 at 357; Intuitive-00463328-403 at 397.

[34] Bomalaski (Rebotix) Report, ¶¶ 18, 23; Dickens (in *Restore*) Dep. at 12:9-13:23.

21. While the first robot-assisted surgery was done in the 1980s,[35] the 1990s saw the introduction of the "first robotic system for laparoscopic surgery."[36] This was the Aesop, developed by Computer Motion, which would subsequently develop the Zeus surgical robot.[37] Around that same time, the robot which would be developed into an early version of the da Vinci was also launched by the company that would become Intuitive.[38] After Intuitive and Computer Motion merged in 2003, the Zeus surgical robot was phased out, which left the "the da Vinci as the only commercially available tele-operated surgical system for many years."[39] As will be discussed in Sections II.B and II.C below, "several RAS [robotic assisted surgery] systems have been developed, but only a few of those systems have been commercialized,"[40] and none other than the da Vinci have sold more than a dozen units in the United States.

22. The use of robotic surgery has continued to grow. One study found "the use of robotic surgery for all general surgery procedures increased from 1.8% to 15.1% from 2012 to 2018."[41] By the late 2010s, minimally invasive robotic procedures were becoming or already considered the "standard of care," at least for certain procedures.[42]

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[35] Pugin et al. (2011) at e4.
[36] Kelley (2008) at 355.
[37] *Id*.
[38] Tim Lane, *A Short History of Robotic Surgery*, ANNALS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, 2018 (hereinafter "Lane (2018)"), at p. 6.
[39] Jonathan Douissard et al., *The da Vinci Surgical System*, in BARIATRIC ROBOTIC SURGERY (2019) (hereinafter "Douissard et al. (2019)") at 14; see also, Pugin at al. (2011); Rubach Report ¶ 22.
[40] Sally Kathryn Longmore et al., *Laparoscopic Robotic Surgery: Current Perspective and Future Directions*, 2 ROBOTICS 9, at 1 (2020) (hereinafter "Longmore et al. (2020)").
[41] Kyle H. Sheetz, et al., *Trends in the Adoption of Robotic Surgery for Common Surgical Procedures*, JAMA NETWORK OPEN, January 2020, Vol. 3(1) (hereinafter "Sheetz et al. (2020)").
[42] Evalyn I. George et al., *Origins of Robotic Surgery: From Skepticism to Standard of Care*, 22 JOURNAL OF THE SOCIETY OF LAPAROSCOPIC & ROBOTIC SURGEONS 4, Oct-Dec 2018, at 1 (hereinafter "George et al. (2018)") ("…the surgeon-controlled (multifunctional) robotic telepresence surgery systems that have become a standard of care"). *See also*, Lane (2018) at 5 ("Robotic procedures are rapidly becoming the new standard of care."); Jaimy Lee, "Surgical-robot costs put small hospitals in a bind," *Modern Healthcare*, 2014, available at https://web.archive.org/web/20220324014644/https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind (accessed 10/6/2022), (Robot-assisted surgery "is considered a standard of care."). Estape (in *In re: da Vinci*) Dep. at 64:7-15 ("Q. Do you agree that minimally invasive robotic procedures have become the standard of care? […] A. That's a good question. In my hands, absolutely standard of care. I

B. Intuitive's da Vinci Robot and Aftermarket Products and Services

1. The da Vinci Robot

23. The da Vinci is a minimally invasive soft-tissue robot used in procedures as an "alternative to both open surgery and laparoscopy."[43] The da Vinci was approved in 2000, making it the first FDA-approved surgical robot in the US.[44]

24. The da Vinci robots "are cleared by applicable regulatory agencies for use in a number of different procedures."[45] The da Vinci is "generally used for soft tissue surgery for areas of the body between the pelvis and the neck, primarily in general surgery, gynecologic surgery, urologic surgery, cardiothoracic surgery, and head and neck surgery."[46] The da Vinci can be and has been used for "off-label" procedures, as well as for procedures having an FDA indication.[47]

i.Three Consoles/Carts Making Up the Robot

25. The da Vinci robot is comprised of three parts: "(i) the patient-side cart; (ii) the surgeon console; (iii) the vision cart."[48] See Figure 2 below. Intuitive's

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think there's still a lot of debate out there whether it's truly the standard of care, but I think the data is starting to become overwhelming where it should become the standard of care, in certain procedures for sure.").

[43] Cancer Treatment Centers of America, "Robotic Surgery", available at https://www.cancercenter.com/treatment-options/surgery/surgical-oncology/robotic-surgery (accessed 6/13/2021). *See also*, Informa Pharma Intelligence, "Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical In 'Soft Surgery Robotics,'" April 2020, available at https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 10/6/2022).

[44] Douissard at el. (2019) at 14.

[45] Intuitive Surgical, *Intuitive for Patients*, https://www.intuitive.com/en-us/patients/patients (accessed 8/23/2022). *See also*, Intuitive-00002201-501 at 219-220; Intuitive-00002502-876 at 515-516.

[46] Intuitive Surgical Form 10-K, FY2020, at 57.

[47] *See, e.g.*, Intuitive-00021510-514 at 513 ("Conference Highlights….Live Telesurgeries: Dr. Charles Miller…performed a robotic-assisted isthmacele excision and repair on the da Vinci Xi (note: this is an off-label procedure)").

[48] Mahdi Azizian et al. *The Da Vinci Surgical System,* in THE ENCYCLOPEDIA OF MEDICAL ROBOTICS (2018), at 7 (hereinafter "Azizian et al. (2018)") ("These subsystems are present in each of the four generations of da Vinci Systems that have been marketed to date."); *see also* Douissard et al. (2019) at 14, Intuitive Surgical, *Da Vinci Surgical Systems*, https://www.intuitive.com/en-us/products-and-services/da-vinci/systems (accessed 7/25/2022) ("Three components…Patient Cart…Surgeon Console…Vision Cart.").

documents and contracts often refer to the da Vinci robot as the da Vinci "system," because it includes the combination of this equipment.[49]

Figure 2: da Vinci Xi robot (left to right: surgeon console, vision cart, patient-side cart)[50]

26. The patient-side cart (also called patient cart) "is the effector unit of the system performing the mechanical action. Controlled by the surgeon via operator console and vision cart, it supports [up to] four robotic arms holding cable-driven articulated instruments and a double-channel 3D endoscope."[51]

27. The surgeon or operator console "allows surgeons to operate while comfortably seated at an ergonomic console viewing a 3DHD image of the surgical field. The surgeon's fingers grasp instrument controls below the display with the surgeon's hands naturally positioned relative to his or her eyes. Using electronic hardware, software, algorithms, and mechanics, our technology translates the

[49] *See* Intuitive Surgical, *Da Vinci Surgical Systems*, https://www.intuitive.com/en-us/products-and-services/da-vinci/systems (accessed 11/8/2022) ("Three components make up a system," showing the patient cart, surgeon console, and vision cart.); Intuitive-01846020, at -20 ("'System' means the items comprising the da Vinci® Surgical System").

[50] Source: Intuitive, *Press Resources*, available at https://www.intuitive.com/en-us/about-us/newsroom/press-resources (accessed 10/6/2022).

[51] Douissard et al. (2019) at 15. *See also*, Intuitive Surgical Form 10-K, FY2020, at p. 6.

surgeon's hand movements into precise and corresponding real-time micro movements of the da Vinci instruments positioned inside the patient."[52]

28. The vision cart "processes information to and from the control and patient carts. It is the core controller and regulatory organ of the system, coordinating audiovisual signals, electromechanical actions, and energy delivery."[53] This includes 3DHD vision and "integrated fluorescence capability that uses near-infrared technology," also known as Firefly.[54]

ii.Multiple "Generations" of da Vinci Robots

29. Intuitive has commercialized four "generations" of the da Vinci.[55] Their general operation and purpose remained the same.[56]

30. The first generation was the da Vinci Standard, commercialized in 1999.[57] It initially had three arms (two operating, one optical),[58] but in 2003 introduced a fourth arm option.[59] It stopped being sold in the U.S. by 2012,[60] but Intuitive still recorded an installed base of 23 units in the U.S. as of 2021Q1.[61]

[52] Intuitive Surgical Form 10-K, FY2020, at p. 5. *See also*, Douissard et al. (2019) at 14 ("The surgeon sits at the operator console outside the operative field. 3D vision is provided through a stereo viewer, and the surgeon controls the robot using master hand controllers and foot pedals. A touch screen allows instrument selection and assignment.").

[53] Douissard et al. (2019) at 14-15.

[54] Intuitive Surgical, da Vinci Vision, https://www.intuitive.com/en-us/products-and-services/da-vinci/vision (accessed 8/8/2022). *See also*, Intuitive Surgical Form 10-K, FY2020, at p. 7 ("This imaging capability combines a fluorescent dye with a specialized da Vinci camera head, endoscope, and laser-based illuminator to allow surgeons to identify vasculature, tissue perfusion, or biliary ducts in three dimensions beneath tissue surfaces to visualize critical anatomy.").

[redacted]

[56] For example, the general operation is the same: the surgeon controls the robot and views the surgery using the surgeon console, the vision cart processes and passes information to and from the surgeon console and patient cart, and the patient cart has the robot arms which hold the instruments used in surgery. *See* Douissard et al. (2019) at 14-15. Likewise, the purpose is the same: to be used in minimally invasive soft-tissue surgery.

[57] Intuitive Surgical Form 10-K, FY2020, at p. 52.

[58] Douissard et al. (2019) at 15

[59] Intuitive Surgical Form 10-K, FY2003, at p. 4.

[60] Intuitive-00800612; Intuitive-00800612 (tab US, row 224).

[61] Intuitive-00702284.

31. The second generation was the da Vinci S, commercialized in 2006.[62] It had "a new modified design to avoid arms' collisions and improve the range of motion."[63] It stopped being sold in the U.S. by 2012,[64] but Intuitive still recorded an installed base of 10 units in the U.S. as of 2021Q1.[65]

32. The third generation was the da Vinci Si, commercialized in 2009.[66] "In addition to a new full HD vision system, this version came with the ability to connect two operator consoles thus allowing 'dual-console mode.'"[67] Intuitive stopped manufacturing it in October 2016 and made its last U.S. sale in 2018.[68] However, the Si still constituted a 16% share of Intuitive's installed base in the U.S. as of 2021Q1.[69]

33. The fourth generation includes three models: the da Vinci Xi (commercialized in 2014), the da Vinci X (commercialized in 2017), and the da Vinci SP (commercialized in 2018).[70] Among other improvements, the Xi uses a "gantry system" to position the arms, which allows for greater range of motion and flexibility in orienting the cart.[71] The X was designed to be a lower-cost solution, which provides some of the benefits of the Xi but with arms similar to the Si.[72] The

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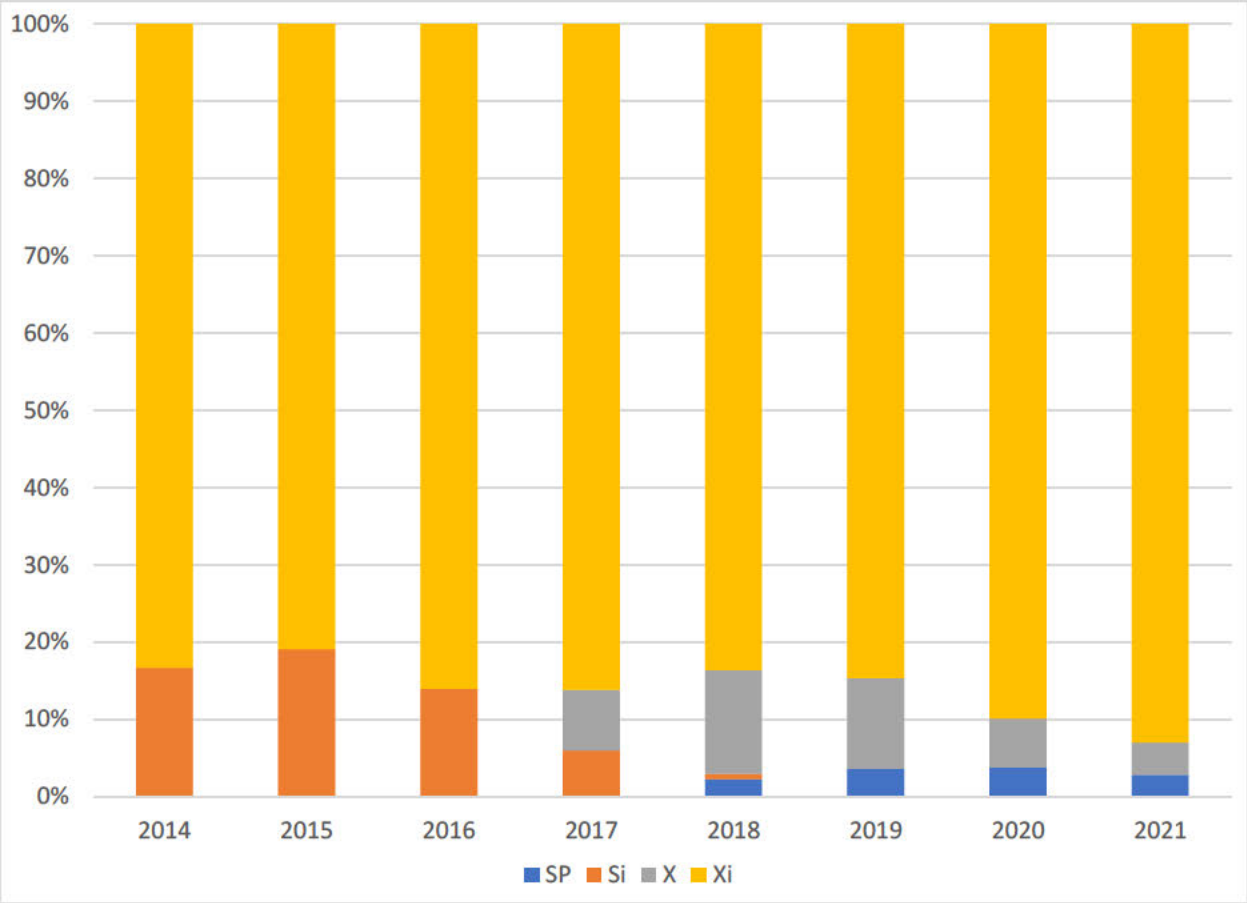
[62] Intuitive Surgical Form 10-K, FY2020, at 52.
[63] Douissard et al. (2019) at 15.
[64] Intuitive-00800612; Intuitive-00800612 (2018 Budget file, tab US, row 229).
[65] Intuitive-00702284.
[66] Intuitive Surgical Form 10-K, FY2020, at 52.
[67] Douissard et al. (2019) at 15.
[68] Intuitive-00102938-989 at 942 ("after October 2016, ISI [Intuitive Surgical, Inc.] will not be manufacturing any more Si units"); Intuitive-00282732; TRE-001316; Intuitive-00595438 – Intuitive-00595463.
[69] Intuitive-00702284; *infra* Figure 4.
[70] Intuitive Surgical Form 10-K, FY2020, at 6, 52; note that Intuitive received "initial U.S. FDA clearance in April 2014" but customers shipments didn't begin until several years later. Intuitive, *Intuitive Surgical Announces Innovative Single Port Platform—the da Vinci SP Surgical System*, Press Release, May 31, 2018, available at http://investor.intuitivesurgical.com/node/8871/pdf (accessed 7/25/2022). *See also*, Intuitive-00098287-354 at 321 ("The most significant difference from the Xi is that X will not have the overhead boom architecture (enabling multi quadrant procedures) or integrated table motion.").
[70] Azizian et al. (2018) at 10-11.
[71] Azizian et al. (2018) at 10.
[72] Azizian et al. (2018) at 10-11.

SP stands for "Single Port," and its distinguishing characteristic is that its instruments are designed to solely be used through a single incision.[73]

34. Although the mix of sales has steadily moved towards fourth generation models, the oldest of those fourth-generation models, the Xi, continued to grow and was the primary model purchased throughout the Class Period, as the following Figure shows.

Corrected Figure 3: Share of U.S. Unit Sales of da Vinci by Model by Year[74]

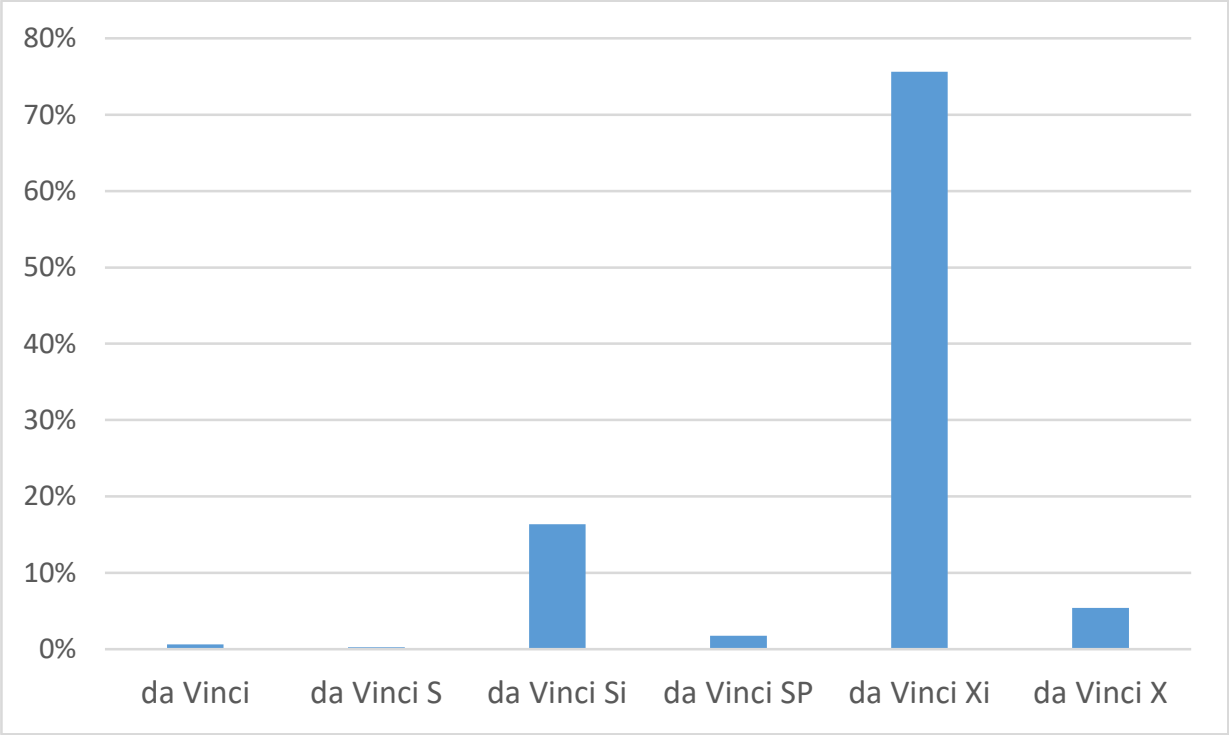


35. Consistent with these sales trends, the da Vinci Xi constituted more than 75% of the da Vinci installed base in 2021. See Figure 4 below.

[73] Intuitive Surgical, *Intuitive Surgical Announces Innovative Single Port Platform – the da Vinci SP Surgical System*, May 31, 2018, available at http://investor.intuitivesurgical.com/news-releases/news-release-details/intuitive-surgical-announces-innovative-single-port-platform-da (accessed 10/7/2022).

[74] Source: Intuitive Robot Transaction Data. Restricted to U.S. sales, calculated as share of units by year.

Figure 4: U.S. da Vinci Installed Base by Model 2021 Q1[75]

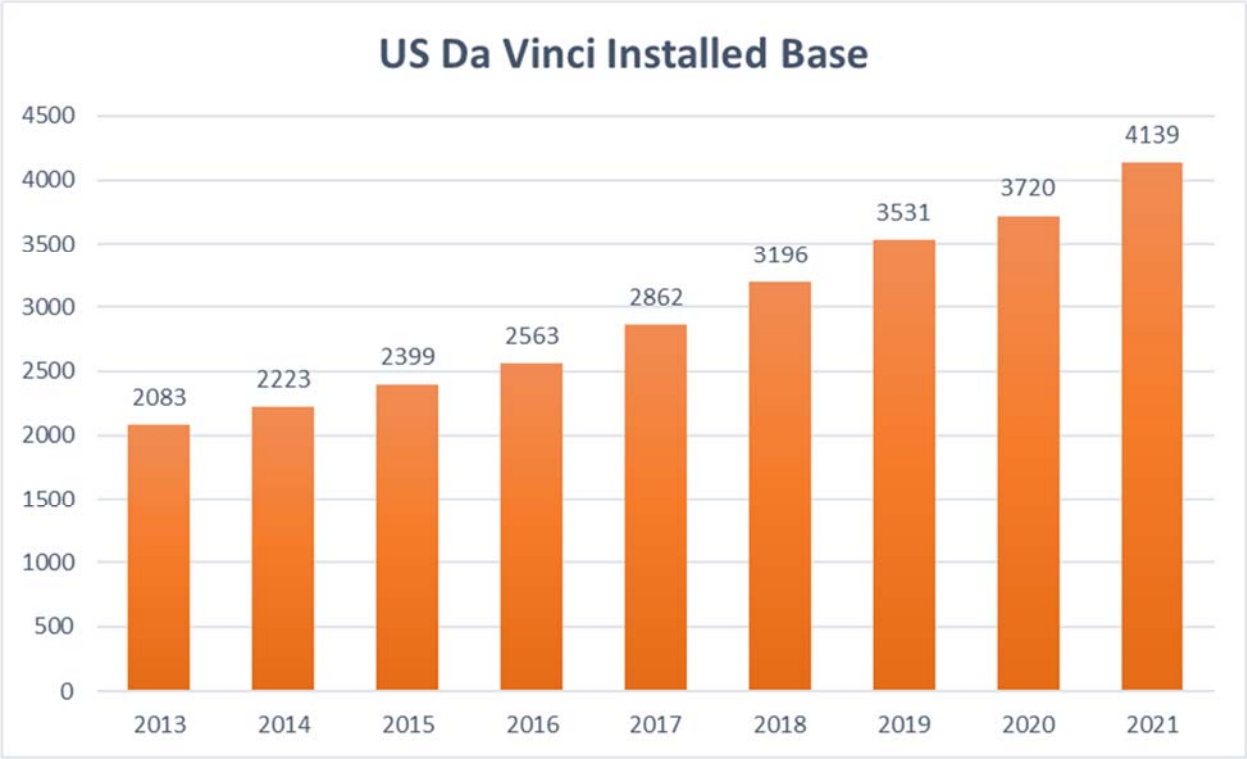


iii. Growing Size of the da Vinci Installed Base

36. As Intuitive has continued to sell its da Vinci robot, the da Vinci installed base has continued to grow. Between 2013 and 2021 the da Vinci installed base has nearly doubled from 2,083 to 4,139. See Figure 5 below.

[75] Source: Intuitive-00702284.

Figure 5: U.S. da Vinci Installed Base[76]



2. Instruments and Accessories

37. A variety of instruments and accessories are used with the da Vinci robot. These include endoscopes, instruments (including surgical, stapling, and energy), cannula and trocars (used to provide access points into the body for the endoscopes and surgical instruments), cleaners and cleaning supplies, and sterile drapes.[77]

38. Many of the instruments used with the da Vinci "have an articulated wrist mechanism," for which Intuitive uses the trade name "EndoWrist."[78] Such

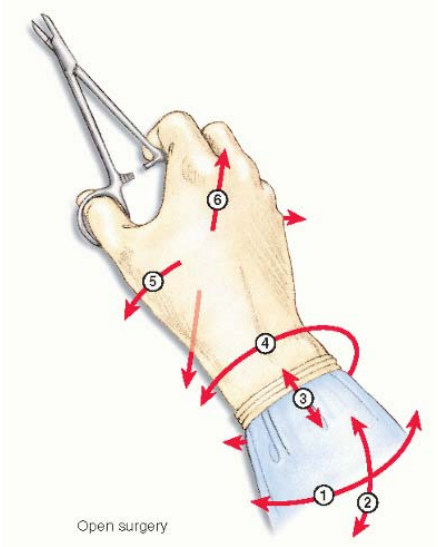
[76] Source: Intuitive Surgical Form 10-K, FY2013 – FY2021.

[77] Intuitive Surgical Form 10-K, FY2021, at pp. 7-8; Intuitive Surgical Form 10-K, FY2020, at p.7 (Intuitive "sell[s] various accessory products, which are used in conjunction with the da Vinci Surgical Systems as surgical procedures are performed. Accessory products include sterile drapes used to help ensure a sterile field during surgery, vision products (such as replacement 3D stereo endoscopes), camera heads, light guides, and other items that facilitate use of the da Vinci Surgical Systems."); Robert Howe 10/1/2021 Dep. (Rebotix), *Rebotix Repair LLC v. Intuitive Surgical, Inc., No.* 8:20-cv-2274 (M.D. Fla.), Ex. 24 at Intuitive-00039626 (automated cleaning systems, such as the da Vinci SonicPro Cleaning System, for cleaning of EndoWrists).

[78] Azizian et al. (2018) at 15.

wristed instruments "make dexterous surgical motions (e.g., those used in suturing) much easier to accomplish."[79] The wristed joints on instruments like these provide additional "degrees of freedom" relative to traditional laparoscopic instruments.[80] See Figures 6 and 7 below.

Figure 6: Human Hand With Six Degrees of Freedom[81]

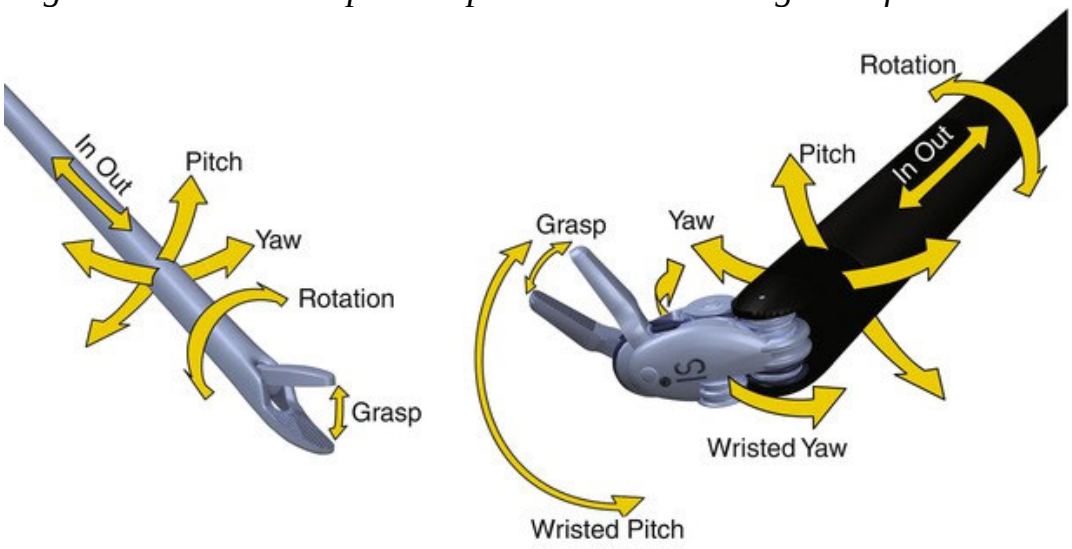


[79] Patrick L Anderson et al., *Robot-like Dexterity Without Computers and Motors: A Review of Hand-held Laparoscopic Instruments with Wrist-like Tip Articulation*, EXPERT REVIEW OF MEDICAL DEVICES 13, July 2016, 661-972 (hereinafter, "Anderson et al. (2016)") at p. 2. See also, Azizian et al. (2018), at 15 (the articulated wrist mechanism "allow[s] for dexterous and intuitive tissue interaction, following the surgeon's [own] wrist articulation."); Bomalaski (Restore) Report, July 26, 2021, ¶ 23 ("Unlike traditional laparoscopic instruments that are straight and rigid, EndoWrists, as the name suggests, are 'wristed' to provide surgeons like me with a great degree of flexibility, dexterity and precision.").

[80] *See, e.g.*, Alexander T. Hillel et al., *Applications of Robotics for Laryngeal Surgery*, OTOLARYNGOL. CLIN. NORTH AM., 41(4), 2008 Aug, 781-vii at p. 3 (hereinafter "Hillel et al. (2008)") ("The human arm is considered to have seven degrees of freedom provided by three joints. Degrees of freedom (DoF) are often described using nautical terminology such as pitch (tilting in a vertical vector), yaw (turning to the left or right), and roll (tilting from side to side). The shoulder is capable of pitch, yaw, and roll, the elbow pitch, and the wrist pitch, yaw and roll totaling 7 DoF.").

[81] Source: Abdominal Key, *Laparoscopic Colon and Rectal Surgery*, Figure 19-16, https://abdominalkey.com/laparoscopic-colon-and-rectal-surgery/ (accessed 11/4/2022).

Figure 7: Standard Laparoscopic vs EndoWrist Degrees of Freedom[82]



i.EndoWrist Instruments

39. As noted above, Intuitive sells its wristed instruments under the trade name "EndoWrist."[83] EndoWrists include "various types of scissors, forceps, needle drivers, retractors, monopolar and bipolar energy instruments, stabilizers, staplers, and vessel sealers."[84]

40. An individual instrument will be compatible with only a subset of da Vinci models.[85] These groups of compatible instruments are: (1) First-generation da

[82] Source: Thoracic Key, *Robotics in Cardiac Surgery: Basic Principles*, Figure 1.4, https://thoracickey.com/robotics-in-cardiac-surgery-basic-principles (accessed 11/4/2022).

[83] Azizian et al. (2018), at 15. ("A family of instruments has been developed for the da Vinci System in order to facilitate tissue manipulation in various types of surgical procedures. Many of these instruments have an articulated wrist mechanism to allow for dexterous and intuitive tissue interaction, following the surgeon's wrist articulation while controlling motion from the master interfaces of the surgical console. EndoWrist® is the trade name for these articulated instruments, which include various types of scissors, forceps, needle drivers, retractors, monopolar and bipolar energy instruments, stabilizers, staplers, and vessel sealers.")

[84] Azizian et al. (2018), at 15.

[85] Intuitive Surgical Form 10-K, FY2020, at p. 52 ("Da Vinci X and da Vinci Xi Surgical Systems share the same instruments whereas the da Vinci Si Surgical System uses instruments that are not compatible with da Vinci X or da Vinci Xi systems. We currently offer nine core instruments on our da Vinci SP Surgical System.").

Vinci-compatible,[86] (2) da Vinci S- and Si-compatible,[87] (3) da Vinci X- and Xi-compatible,[88] and (4) da Vinci SP-compatible.[89]

41. Intuitive's business plan was to design EndoWrists in such a way that other manufacturers would not be able to manufacture competing versions that would work with the da Vinci.[90] In contrast, other MIST surgery robots, such as Medrobotic's Flex, "accommodate a wide variety of third party instruments."[91]

42. In addition to contractual restraints on buyers/lessees using EndoWrists that have been made or repaired by rivals, which are discussed below,[92] Intuitive added a use counter/limiter to EndoWrists that had not existed for traditional laparoscopic instruments.[93] Inside each EndoWrist instrument is a programmed memory chip that "will generally not allow the instrument to be used for more than [a] prescribed number of procedures."[94] Each chip is programmed to "maintain a

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[86] Intuitive Surgical, *EndoWrist Instrument & Accessory Catalog*, October 2011, available at https://dvrk.lcsr.jhu.edu/downloads/manuals/davinci-classic-s-si-instrument-accessory-catalog.pdf (accessed 7/25/2022) (showing different models for "da Vinci" and "da Vinci S/Si").

[87] *See, e.g.*, REBOTIX038479; Intuitive Surgical Form 10-K FY2010 at p. 9 ("Existing da Vinci S instruments…are compatible with the da Vinci Si system.").

[88] *See, e.g.*, Intuitive-00000105.

[89] *Id*. *See also*, 510(k) Summary of "da Vinci SP Surgical System, Model SP999, EndoWrist SP Instruments, and Accessories," April 17, 2014; Thom E. Lobe, *Da Vinci SP Surgical System, EndoWrist SP Instruments, and Accessories*, July 29, 2019, https://www.sages.org/publications/tavac/da-vinci-sp-surgical-system-endowrist-sp-instruments-and-accessories/ (accessed 7/26/2022).

[90] Intuitive-00595673-694 at 682 ("During the design phase, the company will work closely with its patent attorneys to insure that the interface design between RTU [Resposable Transmission Unit, i.e., the reusable instrument] and capital equipment instrument control arms, and between RTU and disposables, have ironclad design patentability. This will secure the Company's resposable and disposable revenue, and insure that other manufacturers will be unable to manufacture unauthorized…RTUs and disposables.").

[91] Easmed, *MedRobotics Flex Robotic System,* https://www.easmed.com/surgical-robot-flex-system/ (accessed 7/27/2022). *See also*, Asensus Surgical Form 10-K, FY 2020, at 9 ("We also have designed the Senhance System so that third- party manufactured instruments can be easily adapted for use.").

[92] *See infra* Section III.

[93] Harrich 5/24/2021 Dep. (Pullman Regional Hospital), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 32:16-20 ("Q. … Does your hospital repair and use over and over traditional laparoscopic instruments, scissors, forceps? A. Yes, we do."), 34:2-7 ("Q. Based on the hospitals you know, it is standard procedure to repair and reuse traditional laparoscopic devices that are similar to the EndoWrist used in da Vinci surgeries; is that right? . . . THE WITNESS: That's correct.").

[94] Intuitive Surgical Form 10-K, FY2020, at 7.

count with the number of remaining uses."[95] The da Vinci vision cart has a settings tab which "automatically" "[d]isplays the uses remaining on the instruments used during the case".[96]

43. An EndoWrist that has reached its use limit will no longer function with the da Vinci robot.[97] Thus, as a counter reaches its use limit, the hospital must replace the EndoWrist with either a new replacement EndoWrist purchased from Intuitive or with a repaired EndoWrist that has had its use limit reset.[98] While Intuitive claims this use limit is imposed "to help ensure that its performance meets specifications during each procedure,"[99] Plaintiffs allege that the use limit and supporting features are "solely intended to exclude competitors from the EndoWrist repair and replacement Aftermarket," thereby "allow[ing] Intuitive to maintain its monopoly and caus[ing] Intuitive's customers to pay exorbitant sums to Intuitive for brand new EndoWrists they do not yet need."[100]

3. Other Products and Services

44. Intuitive offers other related products and services beyond new robots, instruments, and accessories. These include service/repair of the robots and instruments, as well as training.

i.Service/Repair of the da Vinci Robot

45. Each da Vinci robot requires multiple service calls per year. This includes preventative maintenance, such as two annual service inspections, as well

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[95] Intuitive-02068246-297 at 294 ("The OEM EndoWrist uses an off the shelf specialized memory chip to identify the model, serial number, and to maintain a count with the number of remaining uses.").

[96] Intuitive-01196843-986 at 874.

[97] Bob DeSantis 5/17/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 130:19-131:6 ("Q And when those ten uses are up, the instrument will no longer function with a da Vinci robot; right? A Correct. Q What that means is if a surgeon tries to initiate a surgery using an instrument that doesn't have any uses remaining, then the da Vinci will flash an error message; right? A. Correct. If they try to use an expired instrument, they will be informed that it's an expired instrument – Q. And the – A. – and it will not work.").

[98] *Infra* Section II.D.

[99] Intuitive Surgical Form 10-K, FY2020, at 7.

[100] CAC ¶¶ 132-133. Plaintiffs allege that "[t]he maximum use requirement for EndoWrists is not based on safety or effectiveness considerations" and instead obligates customers "to buy far more (ten to twenty times as many) EndoWrists from Intuitive than they actually would need." CAC ¶ 115.

as repairs.[101] Service could range from technical support over the phone to making software updates to replacing a broken da Vinci arm.[102] For at least some types of service, a notification warning appears on the screen of the da Vinci.[103]

46. Although there have been some technical barriers to third parties' ability to perform da Vinci servicing, these have not been insurmountable. One potential barrier was that technicians servicing da Vincis required specialized training and knowledge,[104] but Restore was able to find and hire former Intuitive employees for this role.[105] Another barrier was that Intuitive had developed proprietary service software (along with a specialized laptop) that was needed to perform some types of da Vinci servicing,[106] but that did not eliminate rivals from providing other types of da Vinci servicing.[107] For example, Dr. Eugene Dickens, a

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[101] Mike Madewell 6/11/2021 Dep. (Panama City Surgery Center), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 19:14-21.

[102] *See*, e.g. Intuitive-00348943-944; Clif Parker 5/4/2021 Dep. (Restore), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 185:15-17 ("…Intuitive was, you know, coming in and – and telling them you need to replace a hundred-thousand-dollar arm").

[103] DeSantis (in *Restore*) Dep. at 16:1-5.

[104] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, January 18, 2022, Answer ¶ 68 ("Intuitive admits that servicing da Vincis requires specialized training and knowledge."). *See also*, West Gordon 5/13/2021 Dep. (Restore), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 27:12-28:6, 29:5-12, 31:15-21, 38:3-39:4, 58:3-7.

[105] Parker (in *Restore*) Dep. Ex. 1 at Restore-00002651 ("[Restore] Robotics program technicians are all former Intuitive Surgical field service engineers with years of experience servicing the robot.") and at 74:18-75:8.

[106] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, January 18, 2022, Answer ¶ 64 ("Intuitive admits that its proprietary service software is necessary to perform preventative maintenance and to repair the da Vinci."); DeSantis (in *Restore*) Dep. at 17:12-18:8. (The laptop is necessary to clear the warning sign).

[107] Gordon (in *Restore*) Dep. Ex. 7 at Restore-00026027 ("IS2000 Preventative Maintenance" list) and at 207:12-16 ("Q. If a Restore field technician checked 'pass' for Section II.B., would that be accurate? A. Again, if you have 20 days of logs and they've only used the system twice in the last 20 days, it could possibly be accurate"), 208:2-8 ("MS. LENT: Can we look at III.G? BY MS. LENT: Q. That says: 'Measure real time clock battery.' Could you do that without the laptop? A. Use a multimeter and check it."), 209:8-20 ("MS. LENT: Let's look at IV.D as in 'dog.' BY MS. LENT: Q. This is the E.C.M. Operational Checks. A. Uh-huh. Q. Are these all things that can be done without the laptop? A. Correct. Q. They are? A. Uh-huh. Q. What about E, IV.E., the P.S.M. Operational Checks? A. Yes."), 210:16-25 ("Q. Section V.C., the Illuminator Measurements – A. Uh-huh. Q. – a field technician for Restore would not be able to complete that section; correct? A. Yes, they would. Q. Oh, they would? Okay. Wait. What portion of V.C were you mentioning that couldn't be done? A. No. All that could be done."), 223:21-224:23

surgeon at Hillcrest Medical Center, testified that Restore had the ability to do "period maintenance" and "troubleshoot robotic arms."[108] Hillcrest also hired Restore to replace the battery on a da Vinci.[109] In addition, some hospitals may have found it economical to have a third-party technician take a look at things before calling Intuitive.[110] Clif Parker of Restore testified that even without Intuitive's proprietary laptop, Restore still "did preventative maintenance, we replaced items such as batteries and bulbs, we did other maintenance that – for example, there were a number of arms having difficulties. Instead of replacing the arm on one of them, a screw had backed out and a screw had to be tightened, you know, so doing that – that troubleshooting analysis, and doing the – the real simple repairs that could be

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("MS. LENT: All right. Let's look at IX.C.2. BY MS. LENT: Q. This says: 'Inspect the counter balance pulley for evidence of wear, misalignment or bearing failure.' Why did you mark 'N/A' there? A. I'm not sure. Because that can be done. Q. What about IX.F.1: 'Visually inspect the flat flex cable…' You marked 'N/A' there was well. Why did you mark 'N/A' there? A. I'm not sure about that one either. That can also be done. Q. X.A.1 says: 'Roll axis slider buttons.' Why did you mark – A. That can be done. Q. All right. There are three others on this page in XI, XI.B.6, XI.C.4, and XI – it looks like that's D.1, that are marked 'N/A.' A. See, these could have been things that Bruce had done, too, that I didn't see, and that's why it was 'N/A.' I mean, they could have been, because these are all things that could have been done."); Parker (in *Restore*) Dep. at 184:23-185:20 ("Q. Could you possibly be in or continue a business of servicing da Vinci robots without access to the intellectual property of Intuitive? A. There are certain things . . . you can do. …. Initial troubleshooting. You know, some of the customers wanted us to, you know, be the – the first eyes to look at a robot issue, because they felt that Intuitive was, you know, coming in and – and telling them you need to replace a hundred-thousand-dollar arm when the issue was a much smaller issue; and so they wanted another set of eyes instead of having to trust Intuitive explicitly, which they did not."), 248:6-19 (regarding how to learn what the error codes on the da Vinci robots meant, "Some of them, they were told by other people. Some of them, you know, like I said, you find through the MAUDE reports; and sometimes personnel in the operating room will tell you, yeah, we had a code 52, which means dah, dah, dah.").

[108] Dickens (in *Restore*) Dep. at 5:25-6:4, 45:5-13, 46:4-11 ("Q. Okay. And you mentioned, I think, troubleshooting arms. Well, could you just explain to me what you meant by that. A. You know, occasionally, the – the – sort of the mounting bracket that holds the instrument in place, those can break. There can be internal, you know, mechanical failures.").

[109] Cairo Wasfy 5/18/2021 Dep. (HealthTrust Purchasing Group), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), Ex. 4 at AHS_MGMT-INTUITIVE_0000189.

[110] Parker (in *Restore*) Dep. at 185:04-185:20 ("Q. (By Mr. Ruby) Well, what kind of service could you do -- sharpening? A. Are you talking about repair of the robot or the instruments? Q. Robot first. A. Okay. So there's no sharpening of a robot. The -- Everything from maintenance, repairs. You know, there's a number of things that can be done. Initial troubleshooting. You know, some of the customers wanted us to, you know, be the -- the first eyes to look at a robot issue, because they felt that Intuitive was, you know, coming in and -- and telling them you need to replace a hundred-thousand-dollar arm when the issue was a much smaller issue; and so they wanted another set of eyes instead of having to trust Intuitive explicitly, which they did not.").

done without parts that needed serial numbers. There were other parts that could be obtained from the manufacturer directly that did not require serial numbers, and we could replace those parts, as well."[111]

ii.Service/Repair of the Instruments and Accessories

47. Most EndoWrists are designed to be used more than one time, and there are two categories of action that can be taken to reuse them: first, reprocessing for reuse up to the use limit (discussed in Section I.B.2.i above); and, second, by extending the life beyond the initial use limit imposed by Intuitive.

48. Intuitive's instructions to reprocess EndoWrists up to the use limit include "[c]leaning, disinfection, and sterilization information for reusable instruments" and leave it to the hospital to appropriately perform these tasks.[112]

49. In addition, it is possible for an EndoWrist to be repaired, such that a hospital could continue using it beyond the use limits imposed by Intuitive. In addition to things such as realigning forceps and sharpening scissors,[113] a key element of this repair process is to reset the use counter, which allows EndoWrists to be used beyond the use limits imposed by Intuitive. Both Intuitive and third parties have developed methods to reset the use counter.[114] Intuitive's own

[111] Parker (in *In re: da Vinci*) Dep. at 160:14-161:3.
[112] Howe (in *Rebotix*) Dep. Ex. 24 at Intuitive-00039624.
[113] Kyle Marks 5/21/2021 Dep. (CommonSpirit Health), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 27:10-28:4 ("My understanding of the process is, is that they take the EndoWrist and they reprogram the microchip that's on it to give us the set number of lives, but all of the lives and not just -- I mean, it doesn't self-destruct at the end. In the process, they verify the function of the device. Like I say, if the -- if the forceps were, you know, misaligned, they realign them. If the scissors were, you know, dull, then they were sharpened again, just like we would do for any other, you know, surgical instrument that we use in the hospital, and then we'd get those back."); Parker Dep. at 155:5-12 ("Q This may be a Kevin May question, and if it is please let me know, but what repairs did it store – I'm sorry, what repairs did Restore make to EndoWrists apart from resetting the usage counter? A I can speak generally to that, but that's definitely a Kevin May question, things like, you know, straightening graspers, sharpening scissors, tightening cables, that sort of thing.").
[114] Katie Scoville 5/28/2021 Dep. (Intuitive), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), Ex. 1 at Intuitive-00104183 (Intuitive "Instrument Refurbishing (Project Dragon)"), Intuitive-00104193 ("Feasibility Work Completed" "Confirmed on in house life test units and re-built RMA [i.e., returned] units."); Glenn Papit 6/2/2021 30(b)(6) Dep. (Rebotix), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 67:4-7 ("Q Okay. The workaround to the EndoWrist usage counter is called the Interceptor; is that right?

consultants concluded that third-party Rebotix can reset the use counter with "no effect to the accessory other than the change in the available remaining uses" and with "no unintentional side effects."[115] Intuitive's internal analysis likewise concluded that "re-manufactured" units were "equivalent or better than new instruments."[116]

50. Kevin May of Restore described the repair process for Si-compatible EndoWrists as follows:

> "So we will receive it, do the initial inspection, then we would do electrical safety testing on it. And if – if all those – if it passes all of those, then we will remove the cover. We will then copy the data from the original board. And then we will take our replacement board, and then we will paste all that information from that, the board that we just copied, onto our new replacement board. And we'll set the uses for ten uses. Then the device is – we remove the old board. And then we inspect the instrument, sharpen scissors, tighten the cables, anything that's wrong with the instrument, replace or make sure the – the flushing tubes are proper, make sure the device is clean. And make sure that there's no damage to any of the cables. And then the instrument is – been – the new board is placed. And then the instrument is cleaned through ultrasonic cleaning method, and then rinsed. And then the device goes through electrical safety testing again. And then

A Correct."), at 83:1-6 ("Q Did Rebotix Repairs authorize any other entities to do the repair and install the Interceptor? A We did. Q What entities are those? A Restore Robotics."); Chris Gibson 6/22/2021 Dep. (Rebotix), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 157:24-25 ("Q Did Rebotix Repairs use SIS as a distributor? A Yes."); Stan Hamilton 11/4/2022 Dep. (Rebotix), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 42:1-42:8 ("Q. So from a technical perspective today – as of today, Rebotix has figured out how to reset the usage counter for Xi instruments. Is that what you're saying? […] THE WITNESS: I agree. Yes."); [redacted]

[115] Intuitive-02068246-297 at 294.

[116] Scoville (in *Restore*) Dep. Ex. 1 at Intuitive-00104193.

it – then it goes through a visual inspection again. And then the device is packaged and sent back to the customer."[117]

51. Similar repairs are commonly done on traditional laparoscopic instruments, with the caveat that they do not have use counters which need to be reset. Edward Harrich, director of surgical services at Pullman Regional Hospital, testified that "almost all of our instruments have some form of repair" and agreed that it is "standard procedure to repair instruments used in traditional laparoscopic devices."[118] Stacey Donovan, executive director of surgical services at EvergreenHealth Hospital, was not aware of "any hospitals in the industry that wouldn't repair reusable, traditional laparoscopic instruments."[119] Consistent with this, the market for "[r]eprocessed lap devices (closest parallel to refurb dV [da Vinci]) is $50M in US in 2017."[120]

iii.Training

52. Using the da Vinci requires specialized training. Surgeons undergo a "substantial amount of training" and have invested "a lot of time and effort in building skills on da Vinci."[121] This training "now begins in medical school."[122] For example, by 2020, an "entire generation of gyn[ecology] surgeons ha[d] adopted and trained on the da Vinci."[123]

53. Given the effort required to develop robot-specific skills, market analysts conclude that surgeons "can't be expected to know how to operate multiple

[117] Kevin May 11/3/2022 Dep. (Restore), *In re da Vinci Surgical Robot Antitrust Litigation,* No. 3:21-cv-3825 (N.D. Cal.), at 100:12-102:3.
[118] Harrich (in *Rebotix*) Dep. at 9:5-9, 32:5-24, 34:2-7.
[119] Stacey Donovan 5/27/2021 Dep. (Evergreen Health), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 9:3-14, 30:3-6.
[120] Intuitive-01085533-555 at 542.
[121] DeSantis (in *Restore*) Dep. Ex. 8 at Intuitive-00278204; Enlightened Capital, *Intuitive Surgical (SRG) Investment Write Up*, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022). *See also*, Pope (in *Restore*) Dep. at 23:2-24:4.
[122] Intuitive-00439401-430 at 422.
[123] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, available at https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022).

robots."[124] As a 2019 analyst report noted, "[s]urgeons do not like to change if they can avoid it, and they have invested a lot of time and effort in building skills on da Vinci." [125] Accordingly, "[g]iven the time and energy surgeons have invested in building skills on da Vinci, many will resist considering a new, untested platform."[126]

54. Intuitive has developed significant physical infrastructure for this training. In fact, Intuitive sells a da Vinci skills simulator, which "gives the user the opportunity to practice their skills and gain familiarity with the surgeon console controls."[127] Intuitive also sells a line of EndoWrists specifically for training purposes.[128]

C. Third-Party Repair and Service of Medical Devices

55. Third-party repair services are an important part of many marketplaces. Below I address this in the context of medical devices, and it is also true of devices more generally. For example, the FTC has recognized the important economic benefits of third-party repair for at least forty years.[129] As the FTC noted in a 2021 policy statement, "[r]estricting consumers and businesses from choosing how they repair products can substantially increase the total cost of repairs, generate harmful

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[124] Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in "Soft Surgery Robotics,"* April 2020, available at https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022).

[125] DeSantis (in *Rebotix*) Dep. Ex. 8 at Intuitive-00278204.

[126] DeSantis (in *Rebotix*) Dep. Ex. 8 at Intuitive-00278221.

[127] Intuitive Surgical Form 10-K, FY2020, at p. 6; *see also*, Intuitive Surgical, *da Vinci Skills Simulator*, https://www.intuitivesurgical.com/products/skills_simulator/index.php (accessed 7/25/2022) (allows users to "engage in training with system skills exercises and 3D videos to align training pathways to specific surgical specialties….The simulator experience can be customized with the latest in procedural simulation from our Simulation Marketplace."). *See also*, Douissard et al. (2019) at 23 ("In the recent years [circa 2019]…the concept of 'never the first time on the patient' has been raised….The whole concept of acquisition of surgical skills has moved from the exclusive OR [operating room] companionship to procedural-based curricula, where simulation plays a central role.").

[128] *See, e.g.*, Intuitive-00667503-537 at 529 ("EndoWrist Training Instruments and Accessories").

[129] U.S. Federal Trade Commission, "Nixing the Fix: An FTC Report to Congress on Repair Restrictions," May 2021, at 5 ("The Commission's concern with repair restrictions dates back more than forty years").

electronic waste, and unnecessarily increase wait times for repairs."[130] The FDA has likewise noted that "the objective evidence indicates that many OEMs and third party entities provide high quality, safe, and effective servicing of medical devices;…The continued availability of third party entities to service and repair medical devices is critical to the functioning of the U.S. healthcare system."[131]

1. Third-Party IRC Industry Overview

56. Third-party repair of medical devices is a major industry. The global market for refurbished medical devices was estimated to be $10.8 billion in 2020 and expected to grow more than 12% annually over the next five years.[132] It is estimated that approximately a quarter of the revenue for medical equipment repair and maintenance in the U.S. is earned by third party (non-OEM) companies.[133] Close to 20,000 companies are estimated to be in the business of servicing used medical devices in the U.S. alone.[134]

57. Intuitive's own analysis in 2016 described "[t]he world market for refurbished medical devices in the same class and price range as *daVinci* systems is growing at a healthy rate….it seems likely that demand for refurbished products that can provide good clinical outcomes at reduced cost will continue to grow."[135]

58. This general success of third-party IRCs extends to traditional laparoscopic instruments, which have been described as the "closest parallel" to repaired EndoWrists.[136] The market for reprocessed laparoscopic devices was $50

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[130] U.S. Federal Trade Commission, *Policy Statement of the Federal Trade Commission on Repair Restrictions Imposed by Manufacturers and Sellers*, July 21, 2021, available at https://www.ftc.gov/system/files/documents/public_statements/1592330/p194400repairrestrictionspolicystatement.pdf.

[131] U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/media/113431/download (accessed 7/29/2022).

[132] Business Wire, "Global Refurbished Medical Equipment Market (2021 to 2026) - Industry Trends, Share, Size, Growth, Opportunity and Forecasts - ResearchAndMarkets.com," July 15, 2021, https://www.businesswire.com/news/home/20210715005751/en/Global-Refurbished-Medical-Equipment-Market-2021-to-2026---Industry-Trends-Share-Size-Growth-Opportunity-and-Forecasts---ResearchAndMarkets.com (accessed 10/11/2022).

[133] IBISWorld, "Medical Equipment Repair & Maintenance Services," Industry Report OD4964, December 2021.

[134] Intuitive-00552993-3014 at 997.

[135] Intuitive-02068246-297 at 249.

[136] Scoville (in *Restore*) Dep. Ex. 1 at Intuitive-00104191.

million in the U.S. in 2017.[137] Intuitive's own analysis described a certain type of laparoscopic device as being the "best parallel" in terms of repaired EndoWrist market share, and noted that "reprocessed is already 10% of [the] market" and "[e]xpected to grow >15% in the next ten years."[138]

2. FDA Regulation of Remanufacture, Recondition, and Repair

59. In the U.S., the sale of medical device products is regulated by the FDA.[139] The FDA determines what regulations apply to aftermarket work on those medical devices by "focus[ing] on the specific activities an entity performs on a particular device."[140] The FDA makes a distinction between the following two categories:

(a) Remanufacturing, which "is the processing, conditioning, renovating, repackaging, restoring, or any other act done to a finished device that significantly changes the finished device's performance or safety specifications, or intended use."[141]

(b) Servicing, which "is the repair and/or preventive or routine maintenance of one or more parts in a finished device, after distribution, for purposes of returning it to the safety and performance specifications established by the original equipment manufacturer (OEM) and to meet its original intended use."[142]

Plaintiff expert Kimberly Trautman opines that this definition of remanufacturing excludes "[T]hird-party servicers/refurbishers and 'reconditioners/rebuilder" and that a key limitation is that, even if a repairer takes ownership of a device and resells it, their actions do not count as remanufacturing if the repairs do "not significantly change a device's performance or safety specifications, or its intended use per the definition of remanufacturer . . . ."[143] Further, she also concludes that a repairer also is not engaged in remanufacturing if the repairer repairs a device without taking ownership over the repaired device and promoting it for sale to an end user.[144]

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[137] Intuitive-01085533-555 at 542.
[138] *Id*.
[139] U.S. Food and Drug Administration, "FDA's Role In Regulating Medical Devices," https://www.fda.gov/medical-devices/home-use-devices/fdas-role-regulating-medical-devices (accessed 10/11/2022).
[140] *Id*.
[141] *Id*.
[142] *Id*.
[143] Trautman Report ¶¶ 19, 29, 35
[144] Trautman Report ¶¶ 29, 35.

60. If an entity's actions categorize it as a remanufacturer, then FDA applies certain requirements. A remanufacturer who wants to market a Class II device (such as the EndoWrist)[145] may be required to "submit a 510(k) to FDA" to demonstrate the remanufactured device is "substantially equivalent" to the OEM device.[146] If an activity is categorized as "servicing," then the provider is not required to obtain any specific clearance from the FDA.[147] It is my understanding that when third-party IRCs believe the activity is categorized as servicing (i.e., does not require 510(k) clearance), they continue operating that way unless and until the FDA either obtains an injunction prohibiting them from doing so or amends its regulations to impose new regulatory obligations on IRCs.[148] For example, "Benjamin Biomedical, for the last 30 years, has repaired…400,000 surgical instruments, and we've done it all without FDA clearance because it's a simple service."[149]

61. The absence of a 510(k) clearance requirement does not mean there are no safety checks. The FDA still retains broad enforcement authority over the life cycle of a medical device.[150] One form of safety checks was Rebotix's multiple certifications for its repair process such as ISO 10993, 13485, 9001, 9002, and 9003.[151] Surgeons and hospitals also have some ability to determine whether an instrument is safe for use.[152] As a Deutsche Bank report from 2020 analyzing third-

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[145] Intuitive Surgical Form 10-K, FY2020, at p. 12.

[146] U.S. Food and Drug Administration, "Premarket Notification 510(k)," https://www.fda.gov/medical-devices/premarket-submissions-selecting-and-preparing-correct-submission/premarket-notification-510k (accessed 11/5/2022).

[147] Trautman Report, ¶¶29-31.

[148] Trautman Report, ¶31 and § VI.

[149] David Mixner 6/10/2021 Dep. (Rebotix), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 130:9-131:5.

[150] Trautman Report, § IV.C. *See also*, U.S. Food & Drug Administration, "Overview of Device Regulation," https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/overview-device-regulation (accessed 11/30/2022).

[151] Intuitive-02068246-297 at 294-295.

[152] Dickens (in *Restore*) Dep. at 30:19-31:21 ("THE WITNESS: I would love to be able to use and instrument until it is no longer useful as determined by me…" "And so as surgeons, we understand using our equipment as long as is possible to provide safe, effective care"); Harrich (in *Rebotix*) Dep. at 40:12-25 ("Q. What process does your hospital undertake to inspect an EndoWrist from Intuitive before it's used in a surgery? A. So the inspection process will start in central sterile processing. There is [sic] multiple steps on processing and packaging those instrumentations, protecting the tips on them. Once they're packaged, sent through sterile processing, they come into the room. The scrub tech, when they open the trays, will examine them on the field, make sure that the jaws are open and close, that the – you know, everything is clean, that there is no dried blood, that the ports are working. And then the first assist will do that also.").

party repair of EndoWrists concluded, "[t]hird party servicing of medical devices has been ongoing for decades, and FDA's comfort around this practice regarding patient safety is quite clear."[153]

62. Although the distinction between selling EndoWrist repairs and selling repaired EndoWrists may matter for the above regulatory reasons, the two are economically equivalent because they provide the same result of a functional, repaired EndoWrist. For simplicity, I will thus generally refer to repaired EndoWrists and EndoWrist repair interchangeably, unless the distinction is relevant to some regulatory issue.

II. MARKET DEFINITIONS, MARKET SHARES, AND MARKET POWER

A. Economic Approach to Market Definition

63. When analyzing whether alleged conduct has anticompetitively harmed consumers, economists regularly define a relevant market to determine which products and participants are relevant to assessing those allegations of harm.[154] A common approach to market definition used by antitrust economists is outlined in the U.S. Department of Justice and U.S. Federal Trade Commission's Horizontal Merger Guidelines (hereinafter "HMG").[155]

[153] Intuitive-00552993-3014 at 2993.

[154] This applies to both product and services. For ease of exposition, I will just refer to products. *See* ABA SECTION OF ANTITRUST LAW, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.A. (2012), at 1 ("The purpose of market definition is to provide a context within which competitive effects can be analyzed").

[155] The DOJ/FTC Horizontal Merger Guidelines describe this methodology, among other commonly used market definition methodologies in economic analysis of antitrust issues. Although the government enforcement agencies most often apply this methodology to merger analysis, it is also applicable to exclusionary conduct cases. *See* DOJ/FTC Horizontal Merger Guidelines (2010) n.5 (noting that market definition is similar for non-merger conduct, such as monopolization, except that one cannot assume that the prices that exist in the market are at competitive levels, because the alleged anticompetitive conduct may have in fact already elevated them above competitive levels).

64. In the HMG approach, one starts with the product(s) most similar to the defendant's products at issue, which will be the closest demand substitute(s).[156] For example, in car markets, the closest demand substitute to one luxury sedan is another luxury sedan, after which the next closest substitute is probably a non-luxury sedan, etc. Next, one looks at the smallest possible market that is potentially useful for analysis and evaluates whether that posited market would likely pass the "Hypothetical Monopolist Test." The Hypothetical Monopolist Test asks whether a hypothetical 100% monopolist in a posited market would likely find it profit-maximizing to charge prices that were at least 5% higher than the prices that would prevail if the market were competitive.[157] This test has also been described as determining whether a hypothetical monopolist would find it profitable to impost a Small but Significant Non-transitory Increase in Price, or "SSNIP." If a hypothetical monopolist would do so, then the test is passed, meaning that the posited market is sufficiently broad (i.e., includes a sufficient number of substitutes) to be useful in economic analysis. If the test is failed, that tells the economist that the posited market is too narrow (i.e., includes an insufficient number of substitutes). The posited market should then be expanded to include the next closest substitute, and then the Hypothetical Monopolist Test should be repeated to see whether the slightly broader market is sufficiently broad.

65. The Hypothetical Monopolist Test provides a precise, objective, and quantitatively measurable definition of which potential substitutes are "reasonably interchangeable" with the defendant's product at issue. Under the Test, the "reasonably interchangeable substitutes" are the smallest set of closest substitutes for the defendant's product for which it is true that the price a single firm selling the product and all those substitutes (a hypothetical 100% monopolist) would charge is at least 5% higher than the price that would prevail if those products were competitively sold by multiple firms. This formal definition of reasonably interchangeable substitutes explicitly and quantitatively defines the threshold for when potential substitutes are too distant to be "reasonably interchangeable," which is when competition from those potential substitutes would not constrain the defendant from elevating prices at least 5% above competitive levels.

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[156] DOJ/FTC Horizontal Merger Guidelines (2010), §4.1.1 ("When applying the hypothetical monopolist test to define a market around a product offered by one of the merging firms, if the market includes a second product, the Agencies will normally also include a third product if that third product is a closer substitute for the first product than is the second product.").

[157] *See* DOJ/FTC Horizontal Merger Guidelines (2010), §4 (describing the hypothetical monopolist test).

66. Markets defined using the Hypothetical Monopolist Test usually "exclude some substitutes to which some customers might turn" in response to a price increase for the products in the relevant market.[158] Economists generally define markets narrowly to focus only on close substitutes, because "defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares" that overstate the importance of distant substitutes.[159] Thus, under this Test, the mere fact that some customers substitute between products A and B does not necessarily mean that products A and B are in the same market. Indeed, "The hypothetical monopolist test may identify a group of products as a relevant market even if customers would substitute significantly to products outside that group."[160]

67. Rather, to defeat a posited market definition, the percentage of customers who would switch to other products in response to a price increase of 5% or more must be sufficiently high that that price increase would not be profitable. For example, suppose a hypothetical monopolist in a posited market with a competitive price of $100, cost of $95/unit, and sales of 1000 units would lose 40% of customers to other markets if it raised prices by 5%. That price increase would

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[158] DOJ/FTC Horizontal Merger Guidelines (2010), §4 ("Market shares of different products in narrowly defined markets are more likely to capture the relative competitive significance of these products, and often more accurately reflect competition between close substitutes. As a result, properly defined antitrust markets often exclude some substitutes to which some customers might turn in the face of the price increase even if such substitutes provide alternatives for those customers."); *id*. §4.1.1 ("Groups of products may satisfy the hypothetical monopolist test without including the full range of substitutes from which customers choose."). Relatedly, official commentary to the Merger Guidelines explains: "Even when no readily apparent gap exists in the chain of substitutes, drawing a market boundary within the chain may be entirely appropriate when a hypothetical monopolist over just a segment of the chain of substitutes would raise prices significantly." DOJ/FTC, Commentary on the Horizontal Merger Guidelines 15 (2006). The Merger Guidelines likewise explain that "relevant markets need not have precise metes and bounds." DOJ/FTC Horizontal Merger Guidelines (2010) §4.

[159] DOJ/FTC Horizontal Merger Guidelines (2010), §4 ("Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares. This is because the competitive significance of distant substitutes is unlikely to be commensurate with their shares in a broad market. Although excluding more distant substitutes from the market inevitably understates their competitive significance to some degree, doing so often provides a more accurate indicator of the competitive effects of the merger than would the alternative of including them and overstating their competitive significance").

[160] DOJ/FTC, Horizontal Merger Guidelines (2010), §4.1.1; ABA SECTION OF ANTITRUST LAW, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.B.2.b.(1) (2012) ("The hypothetical monopolist test may be satisfied by a group of products even though it does not include the full range of substitutes available to buyers." (citation omitted)).

still be profitable because profits with the price increase = ($105-$95)(.6)(1000) = $6,000, whereas profits at the competitive price were ($100-$95)(1000) = $5,000. Thus, it would be a relevant market even though a substantial percentage (40%) of customers would switch in response to a 5% price increase because that percentage is not sufficiently high to deter the price increase from occurring.

68. Further, while the hypothetical monopolist test is amenable to quantitative application, it also can be applied based on qualitative evidence.[161] In fact, the HMG states, "Even when the evidence necessary to perform the hypothetical monopolist test quantitatively is not available, the conceptual framework of the test provides a useful methodological tool for gathering and analyzing evidence pertinent to customer substitution and to market definition."[162]

69. Moreover, "[t]he hypothetical monopolist test ensures that markets are not defined too narrowly, but it does not lead to a single relevant market."[163] Instead, antitrust analysis can use "any relevant market satisfying the test, guided by the overarching principle that the purpose of defining the market and measuring market shares is to illuminate the evaluation of competitive effects."[164] Consistent with the approach I outlined above, "[t]here is no single, inherently correct, market definition; it all depends on the anticompetitive effects theory that the market definition is trying to illuminate."[165] Thus, the appropriate approach to market definition should be shaped by the relevant economic question being asked.[166]

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[161] ABA SECTION OF ANTITRUST LAW, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, (2012), I.C.1.a. ("qualitative information or experience can be used to argue that the price elasticity of a particular product is unlikely to be beyond the critical threshold or that a loss is unlikely to be larger or smaller than the critical level"); *id.* at III.B.1.a. ("As in all merger cases, market definition in consumer products cases generally begins with reviewing qualitative information"); *id.* at VIII.B.2.d.(1) ("To test whether two Pharmaceuticals are reasonably interchangeable, economists do not focus solely on whether the products treat the same illness. They also measure (either quantitatively or qualitatively) the own price-elasticity of demand for one or both products and/or the cross-elasticity of demand between the products at issue to assess whether the products are sufficiently close substitutes that one product constrains the pricing of the other product." (citation omitted)).

[162] DOJ/FTC, Horizontal Merger Guidelines §4.1.3 (2010).

[163] DOJ/FTC, Horizontal Merger Guidelines §4.1.1 (2010).

[164] *Id.*

[165] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 273 (4th ed. 2022).

[166] *See* IIB AREEDA, HOVENKAMP & SOLOW, ANTITRUST LAW ¶531a (3rd ed. 2007) ("Finding the relevant market and its structure is typically not a goal in itself but a mechanism for considering the plausibility of antitrust claims that the defendants' business conduct will create, enlarge, or prolong market power").

70. Finally, the HMG recognize that even if the rate of substitution at *current* prices is high enough to make price increases unprofitable, that does not justify broadening the market definition if firms in the market are already exercising market power because those firms will have already raised prices above competitive levels.[167] "The problem is that current prices may already be at monopoly levels, which are where the monopolist maximizes profits and thus by definition mean a monopolist could not profitably raise prices any further.... [A] monopolist would predictably keep increasing prices until its prices did create significant substitution to other products... What we really want to know is what buyer substitution rates would be if prices were elevated from competitive levels, which will differ from current levels if monopoly power actually exists."[168] Thus, "the existence of significant substitution in the event of *further* price increases or even at the *current* price does not tell us whether the defendant *already* exercises significant market power."[169] Indeed, it is regarded as a well-known economic error to broaden the market definition based on evidence of high substitution rates at current prices when those current prices have already been anticompetitively inflated.[170]

71. In this case, the relevant starting point for the Hypothetical Monopolist Test (as laid out above in this section) asks whether the profit-maximizing price a hypothetical 100% monopolist in the sale of the products or services in question (minimally-invasive surgical robots, EndoWrist repair/replacement, and/or robot servicing) could charge would be at least 5% higher than the price that would prevail if there were instead unrestrained competition between multiple sellers of such products or services.[171] In other words, do potential substitutes for these products constrain any significant increase in their pricing?

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[167] DOJ/FTC Horizontal Merger Guidelines §4.1.2 & n.5.

[168] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 265 (4th ed. 2022).

[169] AREEDA & KAPLOW, ANTITRUST ANALYSIS ¶ 340(b) (4th ed. 1998) (emphasis in original), cited in *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 471 (1992).

[170] *See* George W. Stocking & Willard F. Mueller, *The Cellophane Case and New Competition*, 45 AMERICAN ECONOMIC REVIEW 29 (1955) (hereinafter "Stocking & Mueller (1995)"); Luke M. Froeb & Gregory J. Werden, *The Reverse Cellophane Fallacy in Market Delineation*, 7 REVIEW OF INDUSTRIAL ORGANIZATION 241 (1992) (hereinafter "Froeb & Werden (1992)").

[171] For ease of exposition, I will refer to the "products and services" at issue as "products."

B. The U.S. Market for Minimally Invasive Soft-Tissue Surgical Robots Is a Relevant Market

72. Minimally invasive soft-tissue surgical robots are purchased or leased by hospitals, which means that the alternatives to consider when evaluating substitutes for MIST surgery robots are those alternatives that affect hospitals' purchasing decision. Hospitals' consideration among potential alternatives (such as other surgical technologies or continuing to do traditional procedures without buying a surgical robot) could include downstream factors, such as surgeon demand, patient demand, etc. But the market nevertheless must be defined at the level of the hospitals' purchasing decisions, because hospitals are the actual customers.

73. Defendant Intuitive retained an expert in cases brought by IRCs Restore and Rebotix that argues other types of surgeries (e.g., open surgery or other minimally invasive surgery), and even non-surgical interventions (drug therapies), belong in the same market as the da Vinci.[172] But positing that other types of medical and surgical treatments or interventions can be used for some of the same indications as MIST surgery robots does not *alone* answer the relevant economic questions for market definition. As a direct analogy, "[t]o test whether two Pharmaceuticals are reasonably interchangeable, economists do not focus solely on whether the products treat the same illness."[173] The question instead is whether the different medical technologies "compete *closely enough* to be considered part of the same relevant market,"[174] which requires evidence that they are "sufficiently close substitutes" that their existence "constrains the pricing of the other product"[175] to no more than 5% over competitive levels. In other words, would such a price cause so many hospitals to switch away from the posited product (here, MIST surgery robots) to the alleged substitutes that it would be unprofitable for a hypothetical monopolist of that product

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[172] *See, e.g.*, *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, 8:20-cv-02274, ECF No. 145-3, Antitrust Rebuttal Report of Dr. Loren Smith at § IV.

[173] ABA SECTION OF ANTITRUST LAW, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, VIII.B.2.d.(1) (2012).

[174] *Id.*, III.B ("do different types of products that serve a similar function compete *closely enough* to be considered part of the same relevant market?") (emphasis added).

[175] *Id.*, VIII.B.2.d.(1) ("To test whether two pharmaceuticals are reasonably interchangeable, economists do not focus solely on whether the products treat the same illness. They also measure (either quantitatively or qualitatively) the own price-elasticity of demand for one or both products and/or the cross-elasticity of demand between the products at issue to assess whether the products are sufficiently close substitutes that one product constrains the pricing of the other product.").

to charge a price that high?[176] As detailed below, multiple sources of evidence indicate that the alleged substitutes do not compete closely enough with MIST surgery robots to provide such a price constraint, and thus indicate that those alleged substitutes are not in the same product market.

1. MIST Surgery Robots Provide Benefits to Hospitals that Traditional Surgical Technologies Cannot

74. Hospitals treat MIST surgery robots as something which traditional surgical technologies cannot replace. As one market analyst concluded, there is "a distinct demand for minimally invasive surgical robots like the Da Vinci compared to laparoscopic instruments and open surgical instruments."[177] This is reflected in the fact that "100% of the top ranked cancer, urology, gynecology, and gastroenterology centers in the US have da Vinci robotics programs. It is why the top 10 cancer centers have 40+ da Vincis."[178]

75. There are at least three reasons why hospitals treat traditional surgical techniques as being unable to replace MIST surgery robots. First, having MIST surgery robots can potentially attract patients and increase revenues. Second, having MIST surgery robots can help attract surgeons. (These two components are interrelated, as these surgeons can in turn help attract additional patients.) Third, MIST surgery robots can potentially reduce costs by reducing the length of stay and severity of complications. These will be explored in more detail in the subsections below.

76. As noted by Joy Johnson, Chief Operating Officer at Sanford Bemedji Medical Center in Minnesota:

> Patients want robotic surgery because it means shorter hospital stays and faster recoveries for them. New physician surgical grads are trained in robotic surgery and they want to use those skills. If patient

[176] *See id*. ("If buyers *would switch* to the next best substitute in volumes sufficient to make the price increase unprofitable, the examining agency expands the candidate market by including this substitute.") (emphasis added).

[177] Imron Zafar 11/1/2022 Dep. (Deutsche Bank), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 217:25-218:8.

[178] Glenn Vavoso 5/14/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), Ex. 9 at Intuitive-00269125.

retention and physician recruitment are negatively impacted, that can impact a hospital's bottom line.[179]

77. These unique benefits from MIST surgery robots mean that hospitals are unlikely to switch away from them in response to prices that are 5% above competitive levels, and thus they support a conclusion that MIST surgery robots are a relevant product market. For example, one director of surgical services testified the hospital would not "look to perform more traditional, nonrobotic surgeries instead of purchasing a da Vinci" if faced with a price increase for the da Vinci,[180] and reasoned that a "hospital need[s] a da Vinci robot in order to service the patients' and the surgeons' demands."[181]

i. MIST Surgery Robots Help Hospitals Attract Patients and Drive Revenue

78. To survive in the business of providing healthcare, hospitals must attract patients because "there continues to be a very competitive landscape for hospitals to compete for patients."[182] In fact, hospitals have closed when they cannot get enough patients.[183]

79. Hospitals know they can attract patients by offering robotic surgery. Patient demand for robotic surgery is no surprise, as Intuitive vigorously promotes that da Vinci surgery offers potential benefits to patients and advertises the same message to patients.[184] One industry study notes that "demand for minimally

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[179] Candi Helseth, *Technology Widens Care Options for Rural Hospitals*, THE RURAL MONITOR, February 12, 2014, https://www.ruralhealthinfo.org/rural-monitor/technology-widens-care-options. *See also*, Intuitive-00073538-559 at 541 ("Enables hospitals to attract surgeons and their patients."); Intuitive-00014395-396 at 395 ("Attracts surgeons to hospitals (and surgeons bring patients/procedures) to drive business.").

[180] Harrich (in *Rebotix*) Dep. at 9:5-9, 51:7-16.

[181] *Id.* at 51:19-22.

[182] Pope (in *Restore*) Dep. at p. 27:20-25. *See also*, Intuitive-00001788-851 at 796 ("Hospitals in the US are under immense cost pressures").

[183] Becker's Hospital CFO Report, *10 Hospitals Have Closed This Year – Here's Why*, 10/7/2022, https://www.beckershospitalreview.com/finance/9-hospitals-have-closed-this-year-here-s-why.html (accessed 11/30/2022); Dan Harsha, *How Do Hospital Closures in the United States Impact Patient Care?*, 4/12/2022, https://www.hks.harvard.edu/faculty-research/policy-topics/health/how-do-hospital-closures-united-states-impact-patient-care (accessed 11/30/2022).

[184] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, 1/18/2022, Answer ¶ 27 (Intuitive "admits that da Vinci surgeries may offer lower complications rates and reduce the lengths of patient stays than alternative healthcare options for certain procedures."). *See also*

invasive surgeries that use robotic surgery equipment is growing fast because such operations cause patients to experience less pain, trauma and bleeding than traditional open surgeries."[185] Joy Johnson, chief operating officer at Sanford Bemidji Medical Center (SBMC), noted that "[t]oday's patients are smart and savvy, and they request best practice options such as robotic surgery," and "will travel long distances" for it.[186] Having a surgical robot "[a]ttracts referrals for more complex surgical care in robotic-eligible service lines."[187] The converse is also true, with one hospital's director of surgical services noting that if his hospital "did not have a da Vinci surgical robot" "we would lose customers."[188] Plaintiff expert Dr. Eugene Rubach likewise opines that "U.S. hospitals that do not have a da Vinci robot find themselves at a great disadvantage in . . . trying to appeal to patients seeking minimally invasive surgical treatments."[189]

80. MIST surgery robots not only attract patients who will be treated with them, but also create a "halo effect" that attracts patients (and revenue) for other procedures.[190] Buying a surgical robot has been described as the entry fee to develop

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Rafael E. Perez and Steven D. Schwaitzberg, *Robotic surgery: finding value in 2019 and beyond*, ANNALS OF LAPAROSCOPIC AND ENDOSCOPIC SURGERY, 2019, Vol. 4, at 5 ("Extensive marketing has led to increased demand, not just from surgeons, but from patients.").

[185] IBISWorld, *Surgical Instrument Manufacturing,* Industry Report OD4103, July 2022, at 26.

[186] Candi Helseth, *Technology Widens Care Options for Rural Hospitals*, THE RURAL MONITOR, February 12, 2014. *See also*, Jaimy Lee, *Surgical-robot costs put small hospitals in a bind*, MODERN HEALTHCARE, April 19, 2014, available at https://web.archive.org/web/20220324014644/https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind/ (Ryan Smith, CEO of Memorial Hospital: "doesn't mind if it takes a while for the pricey new piece of equipment to pay off because it's already attracting patients who previously would have traveled to other hospitals in Colorado or Utah to get robotic surgery.").

[187] Intuitive-00128685.

[188] Harrich (in *Rebotix*) Dep. at 9:5-11, 23:3-7. *See also id.* at 125:2-7 ("A. The conversation at that time were we were losing all our prostate business because of the robot, and the urologist, Dr. John Keizur, saying that 'If we're going to keep doing prostates, we have to get the da Vinci robot.' And so that – that was our goal.").

[189] Rubach Report ¶ 9. *See also id.* ¶ 23.

[190] Intuitive-00946214-271 at 249 ("Insights…Using advanced technology has profound halo effect on practice and public perception"); Intuitive-00128685 ("Creates halo effect for other hospital services, improving community and referring doctor perception."); T3, *Robotic Applications in General Surgery*, T3 REVIEW FROM SG2, May 2008 [#6728442.1-4 at 3] ("Patient-perceived quality of care is higher in hospitals offering robotic surgery as a result of the halo effect—an observed correlation between patient perception and technology adoption."[190]).

a reputation of being advanced or cutting-edge.[191] A rival surgical robot manufacturer's CEO testified that "your hospital is not looked at in the same light as the hospital that does have a surgical robot."[192]

81. Having a surgical robot provides important marketing benefits to hospitals. "It is not uncommon, for example, to see a photo of a surgical robot on the cover of a hospital's marketing brochure and yet see no word mentioning robotic surgery inside."[193] As described in a Wall Street analyst report:

> [R]obotic surgery has become a very effective marketing tool for hospitals who adopt the technology. Many surgical procedures are important profit centers to a hospital which in turn created an incentive for early adopters to advertise these capabilities directly to patients in an attempt to portray the institution as a leading center of excellence for complex illnesses such as cancer.[194]

82. Another potential benefit of MIST surgery robots to hospitals is the ability to attract more profitable patients. Michael Madewell, who is employed by Surgical Care Affiliates, the managing partner of Panama City Surgery Center, testified that obtaining greater reimbursement per surgery was part of the "thought

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[191] Anthony R. Lanfranco, et al. *Robotic Surgery: A Current Perspective*, ANNALS OF SURGERY, Vol. 239(1), 2004 at 19. *See also*, Jaimy Lee, *Surgical-robot costs put small hospitals in a bind*, MODERN HEALTHCARE, April 19, 2014, available at https://web.archive.org/web/20220324014644/https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind/ ("patients may choose a hospital with a da Vinci system based on the perception that it's a state-of-the-art facility."); Goldman Sachs, *Digital Health: Robotic Surgery and the OR of the Future*, November 15, 2018, at 6, https://www.gspublishing.com/content/research/en/reports/2019/09/04/e6434b4e-b5bc-44da-a38b-8a493e24bbc8.pdf (emphasis omitted) (accessed 8/26/2022) (Dr. Redan of Celebration Health "The benefits of being an early adopter of successful technology is a benefit to the hospital."); Rubach Report ¶ 24 ("In addition to attracting well qualified surgeons and educated patients, having a da Vinci robot also creates a 'halo effect' for other hospital services, and can improve community and referring physician perceptions. And in addition to attracting those patients who will be treated with robotic surgery, such 'halo effect' can also attract patients (and revenue) for other procedures.")

[192] Pope (in *Restore*) Dep. at p. 27:20-25.

[193] Lanfranco, et al. (2004) at 19.

[194] Goldman Sachs, *Digital Health: Robotic Surgery and the OR of the Future*, November 15, 2018, at 10, https://www.gspublishing.com/content/research/en/reports/2019/09/04/e6434b4e-b5bc-44da-a38b-8a493e24bbc8.pdf (accessed 8/26/2022).

process" when deciding whether to purchase a MIST surgery robot.[195] "Throughout the country, hospitals are looking to diversify their payor mix in an effort to attract or retain more commercially/privately insured patients. Premier data shows that for the core procedures, da Vinci surgery attracts more commercially insured patients compared to laparoscopic and open surgery."[196]

ii. MIST Surgery Robots Can Lower Hospital Costs by Reducing Complications and Length of Patient Stays

83. Intuitive's answer to the CAC "admits that da Vinci surgeries may offer lower complications rates and reduce the lengths of patient stays than alternative healthcare options for certain procedures."[197] Intuitive's internal presentations list a number of other benefits from da Vinci surgery compared to open and/or laparoscopic procedures, such as significantly "shorter length of stay," "higher number of patients discharged under self-care," "lower complications," "lower rate of blood transfusion," "lower rate of ileus," "lower conversion rate," and "lower complications post-operatively."[198] An analyst report by The Advisory Group concurs that "[h]ospitals may realize some length-of-stay savings."[199]

84. Many of these clinical benefits can translate into cost savings. For example, a 2016 Intuitive presentation indicated that, depending on the surgery, these clinical benefits could result in thousands of dollars of cost avoidance per surgery compared to open surgery or traditional laparoscopic surgery.[200] Intuitive's internal analysis also indicates that da Vinci surgery can lead to / result in "decreas[ed] variability" in outcomes.[201] This is valuable because "unpredictable

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[195] Madewell (in *Restore*) Dep. at 8:23-9:2,69:14-19, 70:10-19. See also, *id*. at 71:3-10 ("Q. Would it [robotic surgery] be more profitable? Would it be more profitable? A. You know what? Profitability is a factor of the amount you get paid minus the cost to do it. If you can't get an increase in the payment for that procedure tied to the increase of the cost of doing it robotically, then you can do 100 of these a month and you are not going to have more profitability.").

[196] Intuitive-00001237-311 at 283.

[197] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, 1/18/2022, ¶ 27. *See also*, Myriam Curet 5/7/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), Ex. 4 at Intuitive-00294033 ("Da Vinci vs lap[aroscopic]" lists a value proposition of "[l]ower conversion rates").

[198] Curet (Rebotix) Dep. Ex. 5 at Intuitive-00519256-257.

[199] Intuitive-00128687-691 at 690.

[200] Intuitive-00015614-660 at 618-634.

[201] Curet (Rebotix) Dep. Ex. 4 at Intuitive-00294038-055.

outcomes" lead to "[i]ncrease[d] healthcare spending" and "[i]ncrease[d] societal burden."[202]

iii. MIST Surgery Robots Help Hospitals Attract Top Surgeons

85. Hospitals place a lot of importance on attracting the best surgeons they can. Having top-notch surgeons is an "essential factor in the success of your facility. Surgeons with solid reputations well known in their field get more referrals from doctors, and more patients request them."[203] It is no surprise then that "[a]ttracting physicians is among hospital CEO's top imperatives."[204]

86. Having a surgery robot helps hospitals attract and retain top surgeons. This can be confirmed from a variety of sources. Stacey Donovan, executive director of surgical services at EvergreenHealth Hospital, confirmed that "the fact that your hospital has da Vinci surgical robots help your hospital attract top surgeons."[205] An Intuitive internal presentation stated that "[a] successful da Vinci surgery program can help attract top talent."[206] Liz Tiernan, a consultant in the Advisory Board Company's research and insights group, noted that small hospitals view the da Vinci as "'a tool they need to recruit and retain surgeons and to stay viable."[207] Plaintiff expert Dr. Eugene Rubach likewise opines that "U.S. hospitals that do not have a da Vinci robot find themselves at a great disadvantage in . . . attracting well qualified surgeons who practice minimally invasive surgery . . . ."[208] A report by the Advisor Board Company concluded that hospitals often purchased a da Vinci robot even when the costs of such purchases exceeded the revenue gains from attracting patients

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[202] Curet (Rebotix) Dep. Ex. 4 at Intuitive-00294040-055.

[203] One Mnet Health, *How to Attract and Retain Top Surgical Talent in Your ASC*, 10/5/2021, https://blog.onemnethealth.com/how-to-attract-and-retain-top-surgical-talent-in-your-asc (accessed 11/5/2022).

[204] Intuitive-00001237-311 at 286.

[205] Donovan (in *Rebotix*) Dep. at 9:3-14, 15:7-16. *See also*, Harrich (in *Rebotix*) Dep. at 125:13-17 ("…we needed the robot to help land urology-trained surgeons. The ones coming out of school that we talked to, as soon as we said we didn't have a robot, the conversation was over and they moved on."), 126:2-7 ("We knew were going to have an extremely difficult time or we were going to get an old-school doctor, someone at the end of their career. If we didn't get a robot, that's what we were going to be stuck with, doing a little bit of a disservice to our community.").

[206] Intuitive-00001237-311 at 286.

[207] Jaimy Lee, *Surgical-robot costs put small hospitals in a bind*, MODERN HEALTHCARE, April 19, 2014, https://web.archive.org/web/20220324014644/https://www.modernhealthcare.com/article/20140419/MAGAZINE/304199985/surgical-robot-costs-put-small-hospitals-in-a-bind.

[208] Rubach Report ¶ 9. *See also id.* ¶ 23.

and the lower costs from reducing the length of hospital stays, because "Purchasing a da Vinci Robot may help recruit and retain top surgeon talent" and "create a halo effect for other hospital services, improving community and referring physician perception."[209]

87. Conversely, not having a MIST surgery robot is a risk factor for hospitals to lose their existing surgeons. Edward Harrich, director of surgical services at Pullman Regional Hospital, confirmed that his "hospital lost a surgeon because [they] were unable to acquire a robot."[210] John Francis, a surgeon at Franciscan, testified that "[i]f Franciscan stopped offering da Vinci surgeries altogether tomorrow," he "would … consider doing da Vinci surgeries elsewhere."[211] Dr. Greta Bernier, chief of surgery at Valley, testified that part of why she moved her practice from the University of Washington to Valley was that she "didn't have adequate access to the robot" at the University of Washington.[212] "Mass exodus of surgeons or recruitment challenges are a risk if robots are restricted or removed from facilities."[213] This becomes a financial problem for hospitals because losing surgeons means losing money.[214]

88. There are several reasons why surgeons are attracted to hospitals which have surgical robots. First, surgeons with robotics training (including those just completing a residency) are looking for hospitals with MIST surgery robots as a condition for practicing at a hospital.[215] This is important enough that "new surgeon

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[209] Intuitive-00128687-691 at 690; Intuitive-00128670-671; Advisory Board, *About Us*, https://www.advisory.com/about-us (accessed 11/12/2022).

[210] Harrich (in *Rebotix*) Dep. at 9:5-9, 12:16-18. *See also*, Donovan (in *Rebotix*) Dep., at 9:3-14, 15:7-16 ("Q. If your hospital no longer had any da Vinci surgical robots, would your hospital lose some top surgeons? … THE WITNESS: Yes, we would.").

[211] Francis (in *In re: da Vinci*) Dep. at 36:6-11.

[212] Greta Bernier 11/7/2022 Dep. (Valley Medical), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 40:20-21:2.

[213] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022).

[214] Donovan (in *Rebotix*) Dep. at 9:5-14, 44:20-45:9 ("We would have… lost business if we chose not -- if we chose to not have a -- the option of minimally invasive robotic surgery at Evergreen, we would have surgeons that would leave, and we would lose revenue.").

[215] Intuitive-00128685 ("Provides surgical teaching programme a competitive advantage in medical student recruitment given young surgeon interest in technology."); Goldman Sachs, Digital Health: Robotic Surgery and the OR of the Future, November 15, 2018, at 10, https://www.gspublishing.com/content/research/en/reports/2019/09/04/e6434b4e-b5bc-44da-

graduates are making career choices based on their ability to access the tool [da Vinci]."[216]

89. Second, there is prestige attached to performing robotic surgery as opposed to traditional laparoscopic surgery. "'[M]any physicians are making a brand out of being a robotic-based surgeon,'" noted Ryan Zimmerman, a medical technology analyst with the global financial services company BTIG Research.[217] The patient demand for robotic surgery described in Section II.B.1.i can be a powerful draw for physicians.[218]

90. Third, doctors may prefer the features and capabilities of MIST surgery robots. This has at least two distinct aspects: (a) being better able to perform complex surgeries,[219] and (b) improved ergonomics that can extend a surgeon's career.[220]

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a38b-8a493e24bbc8.pdf (accessed 8/26/2022) (A November 2018 Goldman Sachs report on "Robotic Surgery and the OR of the Future" noted: "the rise of robotics has significant implications for hospital recruitment of new physicians as training on these technologies now begins in medical school."); Intuitive-00001237-311 at 286 ("This slide shows the proliferation of da Vinci surgery in urology, gynecology, and general surgery resident / fellowship programs, and implies growing surgeon interest in having access to da Vinci Surgical Systems.").

[216] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022).

[217] Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in "Soft Surgery Robotics,"* April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022).

[218] *Id.* ("'Surgeons [who] weren't planning on becoming [users of surgical robots], but were forced into it, because patients may go to a physician who does robotic surgery, has driven Intuitive's growth for many years,' Zimmerman said."); Intuitive-00946214-271 at Intuitive-00946249 ("Quotes… 'For surgeons, it is a brand-builder' … 'Patients are coming to me asking for robotic surgery'"); Intuitive-00128685 (Having a surgical robot "[a]ttracts referrals for more complex surgical care in robotic-eligible service lines.").

[219] Dickens (in *Restore*) Dep. at 13:6-15: "A. You know, for me when I explain this to patients, I would explain laparoscopic surgery is sort of like eating with really long chopsticks, where doing surgery with a da Vinci robot is like eating with my hands. The technical ability to perform tasks is – is not something that most surgeons have in a laparoscopic environment."; Answer to Complaint, 1/18/2022, ¶ 27 (Intuitive's answer to the CAC "admits that the da Vinci may provide surgeons using the system with enhanced visualization, dexterity, precision, that the da Vinci has more 'arms' than a human and that it may minimize surgeon fatigue.").

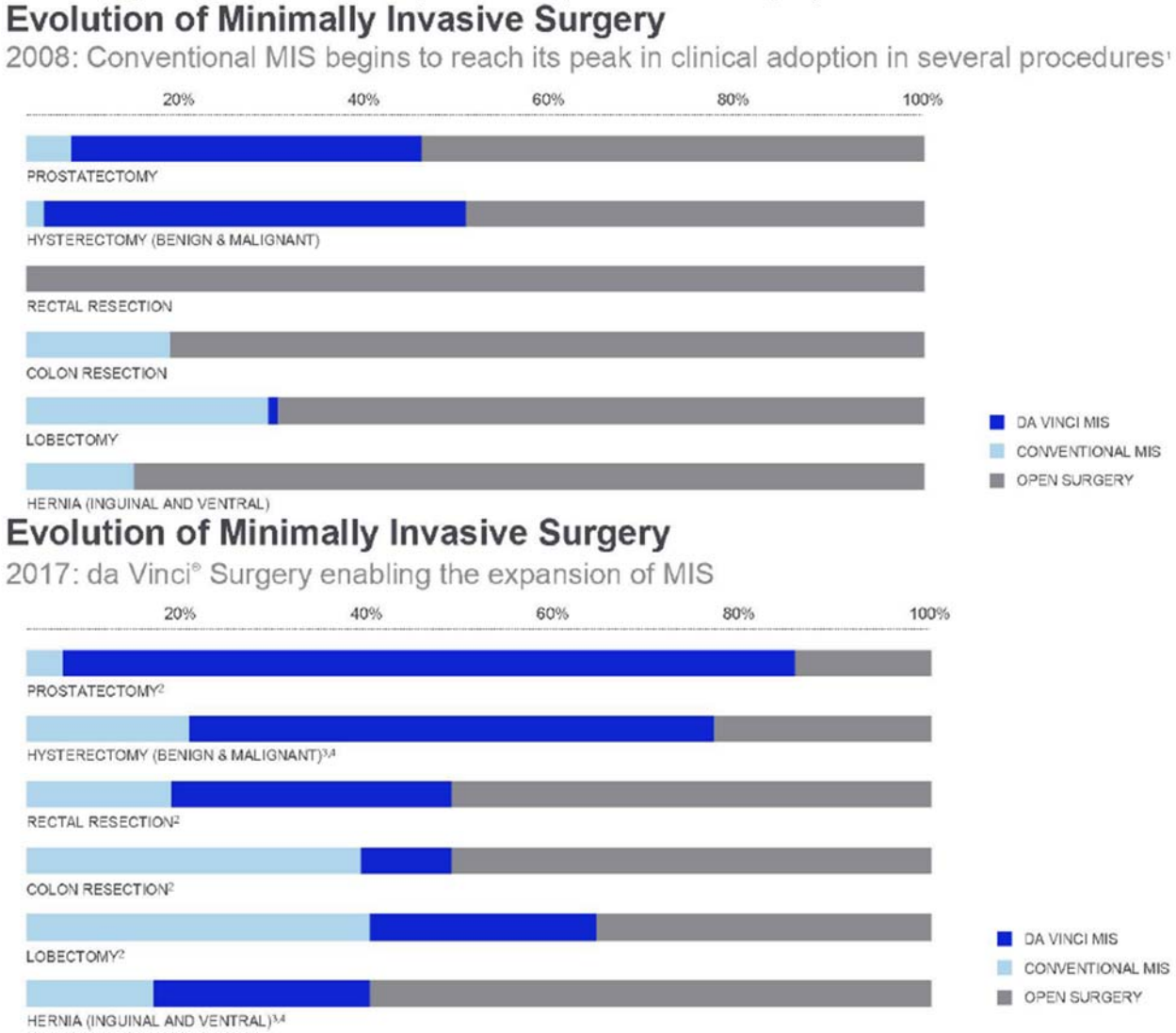
[220] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, available at

iv. One-Way, Asymmetric Substitution in Procedures

91. When assessing whether substitution to other methods of performing procedures would constrain the price of MIST surgery robots, an important consideration is whether the substitution is symmetric. Evidence in this case shows that hospitals have over time been moving from using older technologies with fewer features (open and laparoscopic methods) to using a new technology with more features (MIST surgery robots). As the following Figure shows, the percentage of surgeries using the da Vinci MIST surgery robots grew across multiple procedures from 2008-2017. While conventional minimally invasive surgeries ("MIS"), such as laparoscopic, also grew in some procedures during this time period, the continued growth of surgeries using the da Vinci MIST surgery robot across all these procedures, coupled with the fact that conventional MIS began to reach its peak in several procedures in 2008, indicate that this growth in conventional MIS came at the expense of open surgery, not da Vinci MIST robotic surgery, which is confirmed by other evidence cited below. This was thus a one-way migration, also called asymmetric substitution, as opposed to two-way substitution. In such a situation, the traditional methods of surgery are not providing a significant pricing constraint because they do not threaten to steal back a significant share of procedures from robot-assisted methods. This is consistent with the concept of robotic surgery being a "revolution."

https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022). Citing to Moss et al., *Impact of Obesity on Surgeon Ergonomics in Robotic and Straight-Stick Laparoscopic Surgery*, JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY, Vol. 27(5), 2020, pp. 1063-1069 (One surgeon reported that the robot extended her career as her back and hip no longer bother her as they did with laparoscopic cases, a finding that was validated in this study. Another surgeon shared how she was able to operate up to her due date for her current pregnancy, all because of the [da Vinci] robot.").

Figure 8: "Evolution of Minimally Invasive Surgery" 2008 vs 2017[221]



92. This one-way substitution towards MIST robotic surgery is confirmed by testimony from industry participants. Myriam Curet, Executive VP and Chief Medical Officer at Intuitive, indicated that robot-assisted surgery was a revolution, and a different revolution, than laparoscopic surgery.[222] Indeed, many people in the industry use the analogy of laparoscopy being like a bicycle while robotics is like a Tesla—both are forms of transportation, but one is much more feature-rich.[223]

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[221] Source: Intuitive-00323856-930 at 863-864.

[222] Curet (in *Restore*) Dep. at 6:11-15, 8:16-22.

[223] Pope (in *Restore*) Dep. at 98:18-99:5 ("Q. Mr. Pope, do you have any analogy for explaining the difference between laparoscopic technology and surgical robotic technology? A. Well, many of us in the industry always use the same analogy that it's like transportation. You can get to the

93. Intuitive's internal documents and analysis also describe a one-way migration from traditional methods to robot-assisted methods. They state that the da Vinci was expanding minimally invasive surgery ("MIS") after "conventional MIS begins to reach its peak in clinical adoption in several procedures in 2008."[224] This is consistent with an evaluation that "robotics is seeing increased application in general surgery for procedures that are difficult or impossible to perform via manual laparoscopic approach."[225] This evaluation that robots were used for procedures that are difficult or impossible to perform via manual laparoscopic approach necessarily indicates that the latter would not offer viable economic substitutes for robotic surgery for such procedures. This evaluation of one-way migration is confirmed by the general pattern that more challenging cases were funneled from non-robotic surgeons to those with robotic surgical experience.[226]

94. The one-way nature of this migration is also reflected in the skills and preferences of surgeons. One surgeon noted that "many of our active robotic surgeons now lack the confidence and skills to perform complex hysterectomy via alternative approaches."[227]

95. Hospitals reverting to traditional surgical methods when their surgical robot is unavailable does not indicate that these methods are economic substitutes. For example, Dr. Ricardo Estape, who said he has performed more gynecologic oncology robotic surgeries than anyone else in the world, testified that "every once in a while, if I have an emergency case I have to do where I don't have access to the robot, I might do it laparoscopically, yes."[228] But by their very nature, these situations are uncommon. Further, the "substitution" that may occur in such cases is not an economic substitution being made by hospitals and surgeons when deciding whether to purchase a surgical robot and thus cannot constrain pricing for such

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corner on a bicycle or you can get to the corner on a Tesla. They both are modes of transportation. And that's the way we used to describe laparoscopy as the bicycle and Tesla as the robotics. Robotics is high-tech, you know, very feature-rich product. I mean, that's – I didn't come up with that, but many of us described it that way.").

[224] Intuitive-00001237-1311 at 244-245.

[225] T3, *Robotic Applications in General Surgery*, T3 REVIEW FROM SG2, May 2008 [#6728442.1-4 at 3].

[226] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022).

[227] *Id.* ("As a result, it wouldn't go over well if hospitals tried "to 'force' the existing active robotic surgeons to use an alternative approach to hysterectomy.")

[228] Estape (in *In re: da Vinci*) Dep. at 13:14-14:1, 20:13-21.

robots. It is rather a choice to use other options when the surgical robot option is no longer available for case-specific reasons. These situations are more similar to cases where car owners turn to public transit only when their cars break down. Such "substitution" when their favored option is not available does not mean that cars are not a relevant product market or that public transit prices would prevent a hypothetical monopolist in cars from profitably raising prices by at least 5% over competitive levels.

2. Intuitive Does Not Treat MIST Robotic Surgery as Competing with Traditional Procedures

96. Intuitive's words and actions indicate that it does not treat traditional procedures as a close competitor to MIST robotic surgery. At a high level, this starts with Intuitive's description of robotic surgery as being in a different revolution or generation from traditional surgeries.[229] A report by one of Intuitive's own consultants indicated that Intuitive was initially a startup in a "new market," but now is the "dominant supplier in a well-recognized market."[230] As described in the following sections, (i) Intuitive does not treat traditional procedures like laparoscopy as competing with robotic surgery, and (ii) Intuitive does not closely monitor the pricing for traditional surgical devices or assess buyer willingness to pay for robotic surgeries versus traditional surgeries. Such behavior by Intuitive would make no economic sense if those traditional procedures were close enough substitutes to prevent Intuitive from charging more than 5% above competitive levels, and thus it supports a conclusion that a relevant product market is MIST surgery robots.

i. Intuitive Does Not Treat Traditional Procedures as a Competitive Threat

97. Intuitive's internal documents indicate that it does not treat traditional procedures as a competitive threat. For example, notes prepared for a panel discussion state, "We [Intuitive] do not see ourselves in competition with laparoscopy."[231] Intuitive's analysis of the "[c]ompetitive [l]andscape" points only to other surgical robots as competitors.[232] Intuitive's Executive VP and Chief Product Officer, Bob DeSantis, also testified that "robotics is differentiated from lap

[229] Intuitive Surgical Form 10-K, FY2020 (Describing three "generations" of surgery: Open surgery is the first generation, minimally-invasive surgery is the second generation, and Intuitive represents a third generation of surgery).
[230] Intuitive-02068246-297 at 269 ("As ISi [Intuitive Surgical] continues to grow from a startup in a new market into the dominant supplier in a well-recognized market.").
[231] Vavoso (in *Rebotix*) Dep. Ex. 9 at Intuitive-00269126.
[232] DeSantis (in *Rebotix*) Dep. Ex. 6 at Intuitive-00560381-384.

and its value proposition. So therefore, when we think about our place in the market, we should be thinking about our robotic offering versus other robotic offerings rather than lap."[233]

98. Intuitive's actions also indicate that traditional procedures were not a competitive threat. As described below in section II.C.2, Intuitive set prices so far above costs that economic theory implies it did not see a significant competitive threat. And when Intuitive had its employees sign non-compete agreements, instead of defining competitors as being involved in traditional procedures, it defined competitors as being in "robotic assisted surgery, robotic assisted catheter control, [and] augmented reality surgery."[234]

99. Intuitive's treatment of MIST surgery robots as facing no competitive threat from traditional procedures is echoed by rival MIST surgery robot company TransEnterix, whose CEO Todd Pope described robotic surgery as "totally different" from, and "not a subset of," laparoscopic surgery.[235]

ii. Intuitive Does Not Base Business Decisions on Possible Price Substitution to Traditional Surgical Devices

100. If there were significant price substitution between MIST surgery robots and traditional surgical devices, one would rationally expect a firm like Intuitive to monitor the prices for those traditional devices and to consider buyer willingness to switch to them in response to pricing when making Intuitive's own business decisions on prices and other matters. But consistent with the lack of close price substitution, Intuitive does not closely monitor pricing for such non-robotic options. Further, Bob DeSantis Intuitive Executive VP and Chief Product Officer, testified that he was not aware of Intuitive ever performing market research on buyer willingness to pay for robotic surgeries versus traditional surgeries.[236] Instead, the evidence indicates that Intuitive sets da Vinci robot prices by considering the price and capabilities of competing robots.[237] With regards to competitive robot offerings

[233] DeSantis (in *Rebotix*) Dep., 29:20-30:2.
[234] Vavoso (in *Rebotix*) Dep. Ex. 21 at Intuitive-00423276.
[235] Pope (in *Restore*) Dep. at 11:6-10, 81:6-12.
[236] Vavoso (in *Rebotix*) Dep. at 85:13-19 ("Q. So your understanding that Intuitive performs no market research on the consumers willingness to pay for robotic surgeries versus traditional surgeries? MS. LENT: Objection. THE WITNESS: I'm not aware of specific market research around patients willingness to pay.").
[237] *See*, *e.g.*, Intuitive-00820368-422 at 375-377.

in the U.S., Intuitive noted in 2019 that there was "Limited competition in the near-term."[238]

101. The fact that Intuitive does not base business decisions on possible substitution to traditional surgical devices is likewise echoed by rival MIST surgery robot company TransEnterix, whose CEO Todd Pope indicated that TransEnterix "did not monitor prices for laparoscopic towers on a regular basis" and never "respond[ed] to any changes in prices for laparoscopic towers."[239] These business decisions indicate there was no significant price substitution between MIST surgery robots and laparoscopic towers because, if there were, rational producers of MIST surgery robots would monitor and respond to changes in prices for laparoscopic towers.

3. Robotic Surgery Entails Specialized Vendors

102. The presence of specialized vendors "might suggest gaps in the chain of substitutes, and thus also permit inferences about likely buyer substitution patterns."[240] MIST surgery robots entail specialized vendors. None of the current vendors of MIST surgery robots in the U.S. sell both traditional and robotic equipment. The one existing supplier of traditional equipment that has tried to enter the MIST surgery robot market, J&J, has seen repeated delays and is still years away from commercializing its design.[241]

4. The Relevant Market Does Not Include Other Types of Surgical Robots

103. Other types of surgical robots are not close competitors of MIST surgery robots. As noted by the ECRI Institute, a self-described independent authority on healthcare technology, general-purpose robots like the da Vinci are in a separate group from "robots designed to focus on specific procedures or a

[238] Intuitive-00820368-422 at 410.
[239] Pope (in *Restore*) Dep. at 36:5-12.
[240] Jonathan Baker, *Stepping Out in an Old Brown Shoe: In Qualified Praise of Submarkets*, ANTITRUST LAW JOURNAL, Vol. 68, (2000), at 205.
[241] Sean Whooley, *J&J delaying Ottava surgical robot by 2 years*, THE ROBOT REPORT, October 19, 2021, https://www.therobotreport.com/jj-delaying-ottava-surgical-robot-by-2-years/ (accessed 10/17/2022). *See also*, Chris Newsmarker, *Johnson & Johnson delays regulatory filing for general surgery robot*, THE ROBOT REPORT, July 17, 2020, https://www.therobotreport.com/johnson-johnson-delays-regulatory-filing-general-surgery-robot/ (accessed 10/17/2022).

particular surgical specialty."[242] These specialized robots include orthopedic robots, such as the Mako orthopedic robot.[243]

104. Intuitive has indicated that these specialized surgical robots are not competitors, and therefore are not in the same market. Bob DeSantis, Intuitive Executive VP and Chief Product Officer, testified that orthopedic, endoluminal, and cardiac surgical robots "aren't soft tissue surgical robots," and "if they're not performing the same procedures that we are performing… we're not in competition, by definition."[244] Larry Cesnick, Director of Market Intelligence at Intuitive, indicated that certain robots "are not direct competitors, since they do not do SOFT TISSUE robotic surgery."[245] Given that they are not functional substitutes, they are not economic substitutes, and thus could not constrain a hypothetical monopolist in MIST surgery robots from charging 5% above the competitive level.

5. Other Evidence Also Indicates that Alternatives Do Not Constrain MIST Surgery Robot Prices to Competitive Levels

105. Intuitive's internal analysis indicates that its prices without rival MIST surgery robots were above the level that it would face if it had competition from rival MIST surgery robots. For example, in a June 2017 internal analysis, Intuitive concluded that entry by competing robot systems might have "[s]ome pricing impact" or that Intuitive might have "to discount to be competitive."[246] This evidence indicates that prices were elevated above the levels that would prevail if it faced competition in the MIST surgery robot market. The fact that MIST surgery robot prices were already at supracompetitive levels is not surprising, given that

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[242] FRANCISCAN-00051653-657 at 653; About ECRI, https://www.ecri.org/about/ (accessed 11/5/2022).

[243] DeSantis (in *Rebotix*) Dep. at 32:25-33:10; FRANCISCAN-00051653-657 at 655; Mayo Clinic, *Robotic Orthopedic Surgery*, https://www.mayoclinic.org/departments-centers/robotic-orthopedic-surgery/overview/ovc-20472153 (accessed 11/24/2022).

[244] DeSantis (in *Rebotix*) Dep. at 38:15-39:22, 78:17-24 ("Q. Is it your understanding that robots that don't perform any of the same procedures as the da Vinci robot are in direct competition with the da Vinci soft tissue surgical robot? A. Today, if they're not performing the same procedures that we are performing, I think that's a fair statement. Then we're not in competition, by definition.").

[245] Intuitive-00124485-487 at 485; Discovery Correspondence (Req. 12) #429.1 [Appendix A, *Restore Robotics LLC at al. v. Intuitive Surgical, Inc.*, Intuitive's Proposed Custodians (November 16, 2020)].

[246] Vavoso (in *Rebotix*) Dep. Ex. 16; Vavoso (in *Rebotix*) Dep. Ex. 17 at Intuitive-00362752-753.

Intuitive described its first phase of business through 2019 as "largely without direct competition."[247]

106. Several hospitals have directly indicated that a further 5% increase in MIST surgery robot prices above current monopoly levels would not have caused them to substitute to alternatives. Stacey Donovan, Executive Director of Surgical Services at Evergreen Health, indicated that a 5-10% increase in robot prices would not have caused them to substitute to nonrobotic surgeries because they would have "lost business."[248] Edward Harrich, Director of Surgical Services at Pullman Regional Hospital, also testified that his hospital would not have performed more nonrobotic surgeries in lieu of purchasing a da Vinci robot if Intuitive raised prices by 5-10%.[249]

107. Consistent with this conclusion is the fact that prices for MIST surgery robots are far higher than prices for similar laparoscopic setups. A laparoscopy tower, which has the software and hardware necessary to display video of the surgery and is the main capital cost of laparoscopic surgery, can be priced for as little as $100,000.[250] In contrast, average prices for MIST surgery robots are over $1 million.[251] Hospitals would not rationally be willing to pay more than ten times more

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[247] Intuitive-00366044-053 at 045 ("2020-2023 Intuitive as First Choice among Multiple Options… a. Intuitive's first phase of business was largely without direct competition. b. How we compete in the second phase, and place ourselves as first choice for customers among competitive options…").

[248] Donovan (in *Rebotix*) Dep. at 9:5-14, 44:20-45:9 ("Q. If Intuitive raised the price of the da Vinci robot by 5 to 10 percent, would your hospital have looked to perform more traditional nonrobotic surgeries instead of acquiring the da Vinci robot? … THE WITNESS: No, we would not have. … Q. And why not? A. We would have – we would have lost business if we chose not – if we chose to not have a – the option of minimally invasive robot surgery at Evergreen, we would have surgeons that would leave, and we would lose revenue.").

[249] Harrich (in *Rebotix*) Dep. at 9:5-11, 51:7-13 ("Q. If you plan to purchase a new da Vinci robot and its quoted price and Intuitive raised the price by 5 to 10 percent, would your hospital look to perform more traditional, nonrobotic surgeries instead of purchasing a da Vinci robot? THE WITNESS: No.").

[250] Pope (in *Restore*) Dep. at 24:5-26:10.

[251] Intuitive Surgical Form 10-K, FY2021, at p. 70 ("The da Vinci Surgical System ASP, excluding the impact of systems placed under operating lease or usage-based arrangements and Ion systems, was approximately $1.55 million for the year ended December 31, 2021, compared to approximately $1.50 million for the year ended December 31, 2020."); TransEnterix, Inc. Form 10-K FY2019 at 38 ("Company also recognized $1.3 million…related to a 2017 system sale for which revenue was deferred until the first clinical use."); Intuitive-00226706-717 at 709 ("Medrobotics Flex System" "System Cost $950K - $500K (have sold for less)". The vast majority of sales are of Intuitive's da Vinci. *Infra* Table 1.

for MIST surgery robots than for similar laparoscopic setups if the two were close substitutes that were equally as useful to hospitals.

6. The Relevant Geographic Market Is the United States

108. The relevant geographic market for MIST surgery robots is the United States. Intuitive's own economics expert, Loren Smith, agreed with this conclusion in the Rebotix case.[252] Because MIST surgery robots are a medical device, they are regulated by the FDA.[253] As Intuitive Senior VP Glen Vavoso testified, "[w]ithout FDA approval" robots for surgeries that exist outside of the United States can't be used for surgeries inside the United States.[254] Further, those robots that receive FDA approval can sell throughout the United States. Accordingly, U.S. buyers of MIST surgery robots can turn to any supplier that sells in the United States (since such a supplier necessarily has FDA approval), but U.S. buyers cannot turn to any supplier that sells in another nation without such FDA approval. The regulatory inability of U.S. buyers to switch to foreign supply thus indicates that the market is no larger than the United States.

109. There are no regional submarkets within the United States. Suppliers like Intuitive sell MIST surgery robots throughout the entire United States.[255] Further, the cost of freight and packaging is around 1% of product revenue,[256] thus

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[252] Smith 8/30/21 Report (in *Rebotix*), n. 236.

[253] ABA SECTION OF ANTITRUST LAW, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, VIII.C.2.e (2012) ("In the United States, the FDA regulations… also affect geographic market definition, because medical devices sold or distributed to customers in the United States - whether manufactured in the United States or abroad 'must comply with applicable U.S. laws.' As a result, U.S. customers can turn only to manufacturers whose devices are approved for use in the United States.") (internal marks omitted). *See also*, Intuitive Surgical Form 10-K, FY2021, at 15 (The FDA regulates the development, design, non-clinical and clinical research, manufacturing, safety, efficacy, labeling, packaging, storage, installation, recordkeeping, complaint and adverse event reporting, clearance, approval, certification, promotion, marketing, export, import distribution, and service of medical devices in the U.S.").

[254] Vavoso (in *Rebotix*) Dep. at 109:20-110:12. *See also*, U.S. FDA, *FDA's Role in Regulating Medical Devices*, https://www.fda.gov/medical-devices/home-use-devices/fdas-role-regulating-medical-devices (accessed 8/3/2022) ("In the U.S., FDA regulates the sale of medical device products. Before a medical device can be legally sold in the U.S., the person or company that wants to sell the device must seek approval from the FDA.").

[255] *See* Intuitive-00595438–463 (da Vinci robots have been sold to customers in all 50 states and the District of Columbia).

[256] The revenue for da Vinci robots from 2017-2020 was $4,562.7 million, while "Freight & Packaging" costs were $61.9 million. Intuitive-00595405. Dividing 61.9 by 4,562.7 comes to 1.4%.

indicating that any hypothetical monopolist in a regional submarket would not be able to profitably raise prices by 5% or more without triggering substitution to other regions within the United States.

110. The conclusion that the United States is its own geographic market is consistent with the fact that Intuitive itself considers the U.S. its own separate region in its internal analysis monitoring sales, pricing, and market pressures.[257] That internal analysis also shows that different regions have different pricing.[258] That Intuitive treats the U.S. as a separate region in its market analysis and prices differ between regions further support a conclusion that the U.S. is a separate geographic market.

C. Intuitive Had Market Power and Monopoly Power in the Market for MIST Surgery Robots.

111. Intuitive had monopoly power in the market for MIST surgery robots throughout the United States during the entire relevant time period, and thus necessarily also had market power during this period because monopoly power is a higher degree of market power. Three independently sufficient bases confirm Intuitive's monopoly power: (1) high market shares coupled with high barriers to entry and expansion; (2) direct evidence that Intuitive Surgical had the power to raise prices above competitive levels; and (3) direct evidence that Intuitive had the power to exclude rivals. I address each of these bases in the first three sections below. In a fourth section, I show that my conclusion that Intuitive has had monopoly power is corroborated by the assessments of industry participants, including Intuitive itself in its internal documents.

1. High Market Shares Coupled with High Barriers to Entry and Expansion

i. High Market Shares

112. A high market share indicates that a firm has monopoly power when the market also exhibits high barriers to the entry of new rivals and the expansion of existing rivals. Intuitive's share of the U.S. MIST surgery robot market has

[257] Intuitive-00820368-422 at 373, 400; Intuitive-00222365-408 at 373.

[258] Intuitive-00820368-422 at 373. *See also* Marshall Mohr 11/7/2022 Dep. (Intuitive), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.) at 16:10-12 ("So depending on the region, the costs associated with our activities in those regions, pricing would differ from region to region."), 16:16-19:11 (listing factors that vary by international region).

remained at or near 100% for over twenty years. Following Intuitive's 2003 acquisition of Computer Motion, Intuitive had a complete 100% monopoly for over ten years.[259] Its market share dominance has remained durable and stable even after recent competitors entered. Despite entry by rivals in the mid-2010s, Intuitive's share of MIST surgery robots sold remained above 99% in October 2019,[260] and Intuitive's share of the installed base of MIST surgery robots remained no lower than 99.5% throughout the period from 2017-2021. See Table 1 below.

Table 1: Share of Installed Base of U.S. MIST Surgery Robots 2017-2021[261]

Manufacturer/Robot	**2017**	**2018**	**2019**	**2020**	**2021**
Intuitive da Vinci	99.5%	99.5%	99.6%	99.6%	99.6%
TransEneterix Senhance	<0.1%	0.1%	0.1%	0.1%	0.1%
Medrobotics Flex	0.5%	0.4%	0.3%	0.3%	0.2%

113. Public sources consistently indicate that the da Vinci is the most widely used surgical robot.[262] The da Vinci is so dominant that many industry participants simply ignore the Senhance and Flex when describing the industry. For example, the ECRI Institute wrote in 2020 that Intuitive is "the manufacturer with the only general-purpose surgical robots available in the United States."[263] Intuitive's Bob DeSantis testified that "between 1999 and 2019" there were not "any viable

[259] The first rival entrant was Medrobotics Flex, which gained FDA approval in 2015. Khandalavala et al., *Emerging surgical robotic technology: a progression towards microbots*, ANNALS OF LAPAROSCOPIC AND ENDOSCOPIC SURGERY, (2020) at 9 (hereinafter "Khandalavala et al. (2020)").

[260] *See*, *e.g.*, Pope (in *Restore*) Dep. at 31:12-18 ("Q. Looking back at the time of your departure from TransEnterix in October 2019, . . . In terms of units sold, how did Intuitive compare with TransEnterix in market share in the United States at that time? [...] THE WITNESS: I don't know the exact to the decimal point, but I would say over 99 percent market share Intuitive held.").

[261] Source: Intuitive-00571075; Vavoso (in *Rebotix*) Dep. Ex. 14; Intuitive Surgical 10-K 2017 at p. 8, 2018 at p. 9, 2019 at p. 10, 2020 at p. 10, 2021 at p. 12; TransEnterix Senhance Annual Report 2018 at p. 33, 2019 at p. 37, 2020 at p. 40; Asensus 10-K 2021 at p. 13. Note: columns may not sum to 100% due to rounding.

[262] Eric J. Moore, *Robotic Surgery*, Britannica, https://www.britannica.com/science/robotic-surgery/Roboticprocedures; Andrew Luiz Gioia et al., *The History of Robotic Surgery and Its Evolution: When Illusion Becomes Reality*, BRAZILIAN COLLEGE OF SURGEONS, January 13, 2021, pp. 1 and 4; Jay Shah et al., *The History of Robotics in Surgical Specialties*, AM J ROBOT SURGICAL, June 2014, p. 2.

[263] FRANCISCAN-00051653-657 at 653.

alternatives to a surgeon that wanted to perform a minimally invasive soft tissue robotic surgery other than the da Vinci surgical robot."[264]

ii. High Barriers to Entry and Rival Expansion

114. There are also numerous and significant barriers to entry and rival expansion in the MIST surgical robot market. As industry analysts and Intuitive's executives have observed, in this market, entry "[t]akes a lot of knowhow and time and intellectual horsepower"[265] and "barriers to entry are high."[266] Barriers to entry include the cost of developing a surgical robot, obtaining FDA approval, overcoming patent protections, training new surgeons, and the difficulty of convincing hospitals to switch. As described in a 2021 article:

> "For over 20 years, Intuitive built a practically insurmountable competitive moat blocking the entrance of other companies into the market by developing a superior product, protecting its intellectual portfolio, clearing multiple regulatory hurdles, establishing worldwide training centers, amassing a worldwide installation base, building a huge network of distributors and technical support, and gaining surgeons' trust."[267]

115. Developing a MIST surgery robot is time consuming and expensive. TransEnterix's Senhance required more than 12 years and hundreds of millions of dollars to reach the market.[268] J&J has spent many years working on a surgical robot, is still years away, and recently "recorded a partial in-process R&D charge for $900 million."[269]

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[264] DeSantis (in *Rebotix*) Dep. at 69:19-24.

[265] Vavoso (in *Rebotix*) Dep. at 134:16-22. *See also*, DeSantis (in *Rebotix*) Dep. at 58:9-17 ("does take a lot of time and investment to bring a soft tissue robot to market.").

[266] Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in 'Soft Surgery Robotics,'"* April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022).

[267] Koukourikis & Rha (2021) at 18. *See also*, DeSantis (in *Rebotix*) Dep. Ex. 9 at Intuitive-00553113 (Internal Intuitive email quoting Goldman Sachs report: "What we cannot underscore enough is how significant we view the moat and technological advantage that ISRG has built to date…").

[268] Pope (in *Restore*) Dep. at 36:13-19.

[269] Sean Whooley, *J&J delaying Ottava surgical robot by 2 years*, THE ROBOT REPORT, October 19, 2021, https://www.therobotreport.com/jj-delaying-ottava-surgical-robot-by-2-years/ (accessed 10/17/2022). *See also*, Chris Newsmarker, *Johnson & Johnson delays* regulatory filing for general

116. The importance of these costs is magnified by the fact that the costs are incurred up front and potential entrants must raise money for these costs based on the promise of long-term payoffs. As Glen Vavoso of Intuitive noted, "the entire development process to achieving FDA approval, then being able to market a system – or a system could be up to, you know, a 10-year journey."[270] Relevant to this need to finance costs, Intuitive indicated "Cash and/or ability to raise it" was one of its competitive advantages.[271]

117. Much of the time and money required to enter the market is due to the need for FDA regulatory approval.[272] Wall Street analysts are aware that "there is an exceptionally high bar to hurdle for competitors to receive FDA approval."[273] This is a relatively bigger issue for Intuitive's rivals, as "the FDA apparently plans a much more stringent approval process for new entrants into the robotics space."[274]

118. There are also intellectual property challenges to overcome when attempting to develop a MIST surgery robot. This again is a barrier that is potentially larger for later entrants who must not only design solutions to technical challenges, but also design around existing patents. Bob DeSantis, Executive VP and Chief Product Officer at Intuitive, noted that "intellectual property protections that Intuitive has…might be a challenge for another company to design around."[275] Intuitive's website provides notice for scores of patents associated with the da Vinci robot.[276]

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surgery robot, THE ROBOT REPORT, July 17, 2020, https://www.therobotreport.com/johnson-johnson-delays-regulatory-filing-general-surgery-robot/ (accessed 10/17/2022).

[270] Vavoso (in *Rebotix*) Dep. at 132:24-133:2.

[271] Intuitive-00519980-20005 at 985.

[272] Vavoso (in *Rebotix*) Deposition at 133:5-24 ("the FDA process" "could be a large chunk of that lengthy process.").

[273] Enlightened Capital, *Intuitive Surgical (SRG) Investment Write Up*, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022).

[274] Ron Bair 5/24/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), Ex. 4.

[275] DeSantis (in *Rebotix*) Dep. at 12:13-15, 60:4-7. *See also*, Vavoso (in *Rebotix*) Dep. at 150:16-23 ("Company bringing new technology has to be mindful of the intellectual property that belongs to another company."); Intuitive-00519980 at -985 ("Sources of short-term competitive advantage…Patents").

[276] Intuitive, *Patent Notice*, https://www.intuitive.com/en-us/about-us/company/legal/patent-notice (accessed 8/30/2022). *See also*, Enlightened Capital, *Intuitive Surgical (SRG) Investment*

119. Even if R&D and FDA barriers are overcome, additional time is needed between initial commercial launch and any meaningful adoption. As one Wall Street analyst described, "Initiating a limited commercial rollout is just the first step for MDT [Medtronic] and JNJ [Johnson & Johnson], and many investors underestimate the time required to build out procedures, gather evidence, gain international approvals, train surgeons, etc."[277]

120. The need for clinical studies is another barrier to entry and expansion. "Without the clinical data [Intuitive] has, it will be challenging for [Medtronic]/[Johnson & Johnson] to compete on clinical outcomes."[278] As Intuitive noted in an internal "competitive reference compendium" used to prepare its salesforce, "da Vinci Value is Validated" in several ways including "10,000 peer reviewed publications" and "25 government health assessments."[279]

121. Another barrier to entry is the need to convince surgeons to train on and begin using a new robot. There is a "substantial amount of training surgeons undergo to operate these machines,"[280] and surgeons "can't be expected to know how to operate multiple robots."[281] "[A]s much as administrators would love to drive costs down, they will struggle to convert" from da Vinci to rival robots "without surgeon

Write Up, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022) (Intuitive "has been issued or owns over 2,900 patents and has more than 1,900 active patent applications."); Intuitive-00000157 (Patents Database.xlsx).

[277] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278204.

[278] Enlightened Capital, *Intuitive Surgical (SRG) Investment Write Up*, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022).

[279] Intuitive-00391747 at -761. *See also, id*. at 747-751.

[280] Enlightened Capital, *Intuitive Surgical (SRG) Investment Write Up*, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022).

[281] Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in 'Soft Surgery Robotics,'* April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022).

support."[282] Numerous sources indicate the difficulty of convincing surgeons to switch to a new robot:[283]

> "Surgeons do not like to change if they can avoid it, and they have invested a lot of time and effort in building skills on da Vinci."[284]
>
> "Surgeons do not like change. If a surgical approach is creating good patient outcomes, it is very difficult to convince a surgeon to consider a new approach."[285]
>
> "…inertia will be an important barrier to switching. Given the time and energy surgeons have invested in building skills on da Vinci, many will resist considering a new, untested platform."[286]
>
> "Trying to 'force' the existing active robotic surgeons to use an alternative approach to hysterectomy wouldn't go over well, either, especially when many of our active robotic surgeons now lack the confidence and skills to perform complex hysterectomy via alternative approaches."[287]

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[282] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278221.

[283] *See also*, Harrich (in *Rebotix*) Dep. at 57:4-58:23; Curet (in *Rebotix*) Dep. at 13-15; DeSantis (in *Rebotix*) Dep. at 56:19-22 ("Q Has there been compelling competition such that surgeons have switched away from the da Vinci robot to some other system? A To date, little."); Enlightened Capital, *Intuitive Surgical (SRG) Investment Write Up*, December 10, 2020, https://web.archive.org/web/20201210140905/https://enlightened-capital.com/blog/40-isrg-investment-write-up (accessed 8/30/2022) ("high customer switching costs…driven by the large capital cost for the robotic system, and the substantial amount of training surgeons undergo to operate these machines.").

[284] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278204. *See also* DeSantis (in *Rebotix*) 30(b)(6) Dep. at 55:6-12 ("Q Sure. My question is, have surgeons in the United States invested a lot of time and effort in building skills on the da Vinci robot? A It would depend on any particular individual's interpretation of what 'a lot' is. But surgeons have definitely invested time in developing skills on the da Vinci robot."), 56:1-10 ("Q The first part of that sentence says: 'Surgeons do not like to change if they can avoid it.' Do you see that? A Yes. Q Do you understand that to mean that surgeons might not like to change from the da Vinci robot to another platform, given the amount of time that they've spent with the da Vinci platform? A I believe that interpretation is fair, yes.").

[285] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278221.

[286] *Id.*

[287] Eve Cunningham, *Op-Ed: Addressing Our Da Vinci Addiction—A call to action for everyone in healthcare*, MEDPAGE TODAY, October 17, 2020, https://www.medpagetoday.com/surgery/generalsurgery/89175 (accessed 8/26/2022).

> "Q Has there been compelling competition such that surgeons have switched away from the da Vinci robot to some other system? A To date, little."[288]

122. One reason for the difficulty of getting surgeons to switch systems is that they often already are trained on a particular robot when they leave medical school. One of the "unique" advantages that Intuitive has is that "it is in the medical schools where the doctors are being trained."[289] An Intuitive survey of physicians and hospital executives found that these respondents believed Intuitive's deep penetration into hospitals/medical schools shields it from new competitors in the surgery robot market.[290]

123. The difficulty of getting surgeons or hospitals to switch is particularly pronounced because Intuitive has a twenty-year lead in terms of market penetration. MIST surgery robots are a durable (i.e., long-term) product, and Intuitive is the only manufacturer with a long-term presence and track record in this market. Intuitive as well as Wall Street analysts have recognized that this is a unique competitive advantage. The fact that there is already a large installed base of da Vinci robots in hospitals is a challenge to potential competitors.[291] A 2019 Wall Street analyst report noted that "Intuitive has built strong barriers to entry during the 20 years of market leadership in robotic surgery."[292] A 2018 Wall Street analyst report concluded that hospitals' existing multi-million-dollar investments in da Vinci robots means "outright replacements of existing da Vinci systems will be limited" even in the face of rival entry.[293]

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[288] DeSantis (in *Rebotix*) 30(b)(6) Dep. at 56:19-22. See also *id.*, at 69:19-24 ("Q Now, in the period between 1999 and 2019, were there any viable alternatives to a surgeon that wanted to perform a minimally invasive soft tissue robotic surgery other than the da Vinci surgical robot? A No, I don't believe so.").

[289] Intuitive-00011487.

[290] Intuitive-00121229 at 229.

[291] DeSantis (in *Rebotix*) 30(b)(6) Dep. at 59:14-21 ("Q. There's some challenges that potential competitors face when they're trying to – to break into that market or providing care to patients; right? A. Yes. Q. One challenge is that there is an already large install[ed] base of da Vinci robots in hospitals around the United States; is that right? A. Yes.").

[292] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278204.

[293] Intuitive-00364420 at 421 ("The ecosystem at [Intuitive] is broad and deep at most centers and hospitals have invested millions of dollars in this environment. Consequently, we believe outright replacements of existing da Vinci systems will be limited.").

124. Another widely recognized barrier to entry is economies of scale.[294] Intuitive itself recognized that one source of "long-term competitive advantage" was "[m]anufacturing at scale" and that "[a]s we gain scale, we have volume purchasing power."[295] As Intuitive's scale of operations has grown since the start of the Class Period, so have its capital assets. Total property, plant, and equipment (net of depreciation) grew from $0.61 billion at the end of 2017 to $1.88 billion at the end of 2021.[296]

125. The above barriers to entry are confirmed by the fact that entry into the market for MIST Surgery Robots has been rare and unsuccessful, and barriers to expansion are confirmed by the fact that the few firms that did enter were unable to expand in a way that could constrain Intuitive pricing. Starting in 2003, Intuitive was the monopoly provider of FDA-approved MIST surgery robots.[297] The only rivals to obtain FDA approval since then were Medrobotic's Flex in 2015 and TransEnterix's Senhance in 2017.[298] Medrobotics is currently insolvent.[299] Senhance has struggled to capture and retain customers.[300] Even in combination, they have been unable to obtain more than a combined 0.5% share of the market's installed base.[301]

126. Several other companies are in the process of developing MIST surgery robots. While it is important to consider the potential impact of anticipated FDA

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[294] DENNIS W. CARLTON AND JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 79 (4th ed. 2005) ("Bain (1956) pioneered the modern approach to analyzing barriers to entry. He identified three such barriers" including "[e]conomies of large-scale production that require large capital expenditures.").

[295] Intuitive-00519980 at 986 and 005 ("Sources of long-term competitive advantage" includes "Manufacturing at scale"), 995 ("As we gain scale, we have volume purchasing power"). *See also*, Intuitive-00115682 at 682 ("Forces" "Supply chain – power, continuity, scale").

[296] Intuitive Surgical Form 10-K FY2018 (at 80) and FY 2021 (at 101).

[297] Douissard et al. (2019) at 14; *see also*, Pugin et al. (2011).

[298] Vavoso (in *Rebotix*) Dep. at 85:20-86:3; Khandalavala et al. (2020) at 9; Koukourikis & Rha (2021) at 16; Press Release, *TransEnterix Announces US 510(k) FDA Clearance for Senhance Surgical Robot System*, October 13, 2017, https://ir.asensus.com/news-releases/news-release-details/transenterix-announces-us-510k-fda-clearance-senhance-surgical (accessed 7/26/2022).

[299] Kris Olson, *Due to unpaid wages, long line of arbitration cases awaits*, MASSACHUSETTS LAWYERS WEEKLY (July 30, 2020).

[300] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278216 (From a surgeon interviewed by Bernstein Research: "We were excited to buy a TransEnterix robot a couple of years ago after suffering under the Intuitive monopoly for many years. We were excited to see a competitor, and the system looked promising. It has some nice features like the eye-catching camera. But it does not stack up to da Vinci — not even close. It's worse than lap, and now it's in storage.").

[301] *Supra* at Table 1.

approval of competing technologies, none of these companies have indicated they are close to obtaining FDA approval. For example, J&J's Ottava robot has been in development for many years but is currently under a "two-year delay" that extends to the second half of 2024.[302] The Vicarious surgical robot will not make an FDA submission until 2024.[303] The Hugo by Medtronic has repeatedly seen its launch delayed, and is now simply described as "off-schedule."[304]

127. The lack of impact from potential or actual competitors was foreseen by Wall Street analysts. For example, a 2017 J.P. Morgan report noted that "even if a viable competitor were to enter the market tomorrow, it is difficult to envision how ISRG [Intuitive] could be dislodged from its dominant position in the hospital, given the significant installed base and the mindshare within the healthcare community (surgeons are now training on da Vinci, hospitals standardize on the system, etc.)."[305]

iii. Conclusion

128. Intuitive's high market share combined with barriers to entry and expansion supports an economic inference of monopoly power for several reasons. First, it makes it likely that Intuitive has the power to charge prices that are substantially above competitive levels. Intuitive's high market share also allows Intuitive to act as a unitary actor and impose collective action problems on customers without being hampered by a collective action problem itself.[306] Intuitive's high market share also indicates that (1) Intuitive controls enough of the market to restrain

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[302] Sean Whooley, *Johnson & Johnson discloses two-year delay for Ottava robot*, MASS DEVICE, October 19, 2021, https://www.massdevice.com/johnson-johnson-hits-snag-in-ottava-surgical-robot-development/ (accessed 7/28/2022) ("…a first-in-human delay of approximately two years from our earlier projections of the second half of 2022").

[303] Christine Frangou, *Surgical Robots, Once 'On the Horizon,' Poised to Transform Surgery*, GENERAL SURGERY NEWS, July 26, 2022, https://www.generalsurgerynews.com/In-the-News/Article/07-22/Robotic-Surgery/67443 (accessed 7/28/2022).

[304] Susan Kelly, *Medtronic expects revenue from surgical robot in fiscal 2019*, REUTERS, June 6, 2016, http://www.reuters.com/article/us-medtronic-robot-idUSKCN0YS2C3 (accessed 7/27/2022); Susan Kelly, *Medtronic Plans to Answer da Vinci with Rival Soft Tissue Robot,* MEDTECH DIVE, September 25, 2019, https://www.medtechdive.com/news/medtronic-plans-to-answer-da-vinci-with-rival-soft-tissue-robot/563662/ (accessed 7/27/2022); Sean Whooley, *Medtronic: Hugo Surgical Robot Behind Schedule*, THE ROBOT REPORT, November 23, 2021, https://www.therobotreport.com/medtronic-hugo-surgical-robot-behind-schedule/ (accessed 7/27/2022).

[305] Intuitive-00098287 at 345.

[306] Einer R. Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253, 336 (2003).

a substantial share of that market, and (2) Intuitive will profit from a successful exclusionary scheme more than firms with smaller market shares would.[307]

2. Direct Evidence of Power over Price

129. Direct evidence of Intuitive's power over pricing for MIST surgery robots also confirms Intuitive's monopoly power. The ability to increase prices above the competitive level is a hallmark of monopoly power. This means that evidence that Intuitive can raise its prices above competitive levels shows Intuitive has monopoly power.

130. One measure used by economists to assess market power is the Lerner Index.[308] The Lerner Index is based on a profit margin defined as the difference between price and marginal cost, divided by price.[309] The best available indicator of Intuitive's Lerner Index is what, in it is internal analysis, it calls its "contribution margin" percentage of sales.[310] Marshall Mohr, former CFO of Intuitive, testified that Intuitive's "[c]ontribution margin incorporates direct labor, direct material, and…a few other costs" which "are things that only occur if there is a sale."[311] It thus uses a measure of costs that appears to match or come close to the definition of marginal cost. Intuitive calculated that its contribution margin percentage for its surgery robots ranged from 0.60-0.67 (i.e., 60-67%) between 2017 and 2020.[312] Those indicators of its Lerner Index value are not only far in excess of the value of around 0.1 that prevails in highly competitive markets, but also higher than the value

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[307] *Id.* at 335.

[308] ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014) ("A standard measure of profit margin used to assess market power is the Lerner Index"); *see also* William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 939-40 (1981).

[309] This can be written as (P – MC)/P.

[310] *See* Intuitive-00595405.

[311] M. Mohr (in *In re: da Vinci*) Dep. at 33:22-34:5.

[312] Intuitive-00595405. It is my understanding that Intuitive has not provided recent margin data which separates da Vinci robots from Ion robots. *See*, e.g., Intuitive Surgical, Inc.'s Responses and Objections to Plaintiffs' Amended First Set of Interrogatories, Response and Supplemental Response to No. 3. Lacking data specific to the da Vinci robot, I rely on this, given that Ion robots had relatively few sales, *see* Intuitive Robot Transaction Data, and given that these 60-67% contribution margins are similar to earlier numbers that were specific to da Vinci robots. *See*, *e.g.*, Bair (in *Rebotix*) Dep. Ex. 7 at Intuitive-00043052 (referencing da Vinci "system margins at 65%").

of 0.4 to 0.5 that could prevail in reasonably competitive markets.[313] In short, Intuitive's high contribution margins indicate that it was able to maintain prices for the da Vinci robot that were well above even "reasonably" competitive levels. Indeed, they indicate that Intuitive was able to charge prices that were 25-50% above the top of the normal range for a "reasonably" competitive Lerner Index level.[314] This is well above the typical 5% threshold for a SSNIP test and a strong indicator of power over price. Da Vinci's high profit margins thus directly indicate a monopoly power to raise price above competitive levels.

131. Another source of evidence used by economists to evaluate market power is a firm's own-price elasticity of demand. Given the indicated Lerner Index of 0.60-0.67, the own-price demand elasticity for the da Vinci is 1.49-1.67.[315] It is never profit-maximizing for a firm to price at a level where its own-price demand elasticity is less than 1.[316] Accordingly, the economic literature recognizes: "the [demand] elasticity cannot be less than 1, so an estimated [demand] elasticity of less than 2 must be considered rather low."[317] Such a low own-price demand elasticity indicates that there was not close competition between the da Vinci and other alternatives because the own-price elasticity is a function of the cross-price elasticities of demand.[318]

132. This low own-price demand elasticity is consistent with the reality that customers not only found that other alternatives were not a reasonable substitute for

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[313] ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014) ("In a perfectly competitive market, price is driven to marginal cost, making the Lerner Index equal to zero. On the other hand, as firms gain market power, they are able to sustain price above marginal cost, leading to a higher Lerner index. In highly competitive industries, the Lerner index may be around 0.1, whereas in industries that are 'reasonably' competitive, the Lerner Index may be 0.4 or 0.5, but there is no defined rule for identifying market power.").

[314] A Lerner Index of 0.60-0.67 indicates price is 2.5-3 times cost. The Lerner Index of 0.5 (the top of the normal range for a "reasonably" competitive level) indicates that price equals 2 times cost. Thus, Intuitive's high contribution margins of 0.60-0.67 indicate that Intuitive charged prices that were 25-50% above the top of the normal range for a "reasonably" competitive level. *Id.*

[315] This is because a profit-maximizing firms raises prices until its Lerner Index equals one divided by its own-price elasticity. *See, e.g.*, CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005). Thus, the own-price elasticity equals one divided by its Lerner Index, which here is 1/.67 to 1/.6 = 1.49-1.67.

[316] CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 94 (4th ed. 2005).

[317] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66(2), pp. 363-414 at 381. *See also*, CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005), Table 4.1 (at p. 98).

[318] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66, pp. 363-414 at 413.

MIST surgery robots, but also found the da Vinci far more attractive than other MIST surgery robots. Significant attractions of the da Vinci robot included its abilities to work with wristed instruments and to eliminate hand tremors.[319] In contrast, the Senhance has had, at best, a limited offering of wristed instruments.[320] Surgeons have opined that the Senhance "does not stack up to da Vinci"[321] and is a "piece of junk."[322] The Flex's instrumentation has been limited to "manual endoscopic instruments" (i.e., no tremor control).[323]

133. Intuitive's high profit margins for the da Vinci also indicate that it has not operated under a classic razor-and-razor-blades business model, where the razor is sold cheaply in order to win customers in a competitive marketplace, with the plan to make money on expensive blades once customers have committed to the razor. Intuitive clearly is not offering the robot cheaply. Since at least the start of the Class Period, its average robot price has been triple the average contribution cost (i.e., direct labor material and other costs which only occur if there is a sale).[324] Hospitals accordingly describe the cost of buying a da Vinci as being "extremely high."[325] This contrasts with the classic razor-and-razor-blades business model, which is a "well known business revenue model…which involves pricing razors inexpensively, but aggressively marking-up the consumables (razor blades)."[326]

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[319] Malthias M. Aitzetmuller, et al., *Robotic-Assisted Microsurgery and Its Future in Plastic Surgery*, J. CLIN. MED., 2022, 11, 3378, at p. 1 ("RAS [Robotic-Assisted Surgery] can be seen as an evolution of laparoscopic surgery. In addition to the minimally invasive access to the surgical field, they allow performing surgeries with a three-dimensional view, downscaling the surgeon's movements, *tremor elimination, and additional axes of movement*.").

[320] Intuitive-00178722-736 at 729 ("5mm non-wristed" "8-10mm wristed…Needle driver only"); Intuitive-00111283-287 at 286 (from a TransEnterix session in Bern Switzerland, one piece of feedback on the Senhance system was for "[m]ore wristed instruments (only one available).").

[321] DeSantis (in *Rebotix*) Dep. Ex. 8 at Intuitive-00278216 (From a surgeon interviewed by Bernstein Research: The TransEnterix robot (i.e., Senhance) "has some nice features like the eye-catching camera. But it does not stack up to da Vinci — not even close.").

[322] Seeking Alpha, *TransEnterix: Surgical-Robot Expert Calls Senhance "A Piece Of Junk" As Insiders Liquidate Holdings*, https://seekingalpha.com/article/4213245-transenterix-surgical-robot-expert-calls-senhance-a-piece-of-junk-insiders-liquidate-holdings (accessed 11/17/2022) (quoting Richard Johnson, a senior lead surgical robotics specialist in a level 2 trauma center).

[323] Intuitive-00391747-832 at 800 ("The technology, however, is limited to robotic 2D endoscope control with manual endoscopic instruments…").

[324] Intuitive-00595405; M. Mohr (in *In re: da Vinci*) Dep. at 33:24-34:5.

[325] Intuitive-00141567 at 567.

[326] David J. Teece, *Business Models, Business Strategy and Innovation*, 43 LONG RANGE PLANNING 177 (2010). *See also*, Randal C. Picker, *The Razors-and-Blades Myth(s)*, U OF CHICAGO LAW & ECONOMICS, OLIN WORKING PAPER NO. 532,

3. Direct Evidence of Power to Exclude

134. Evidence that a firm has been able to successfully exclude rivals directly shows that the firm has market power because only firms with market power can profitably exclude rivals. Here, the direct evidence shows that Intuitive was able to exercise a power to entirely exclude any competition, thus indicating monopoly power. In particular, as I detail below in Sections III, IV, and V, Intuitive has used its power over MIST surgery robots to exclude third-party IRCs from being able to sell EndoWrist repair and da Vinci service.

135. Similarly, Intuitive was able to profitably shift customers from using the Si (where it faced aftermarket competition) to the X/Xi (where it did not face aftermarket competition).[327] Buyers were aware these restraints were due to Intuitive's monopoly position and felt frustrated.[328] This ability to profitably restrain customer decisions confirms that Intuitive has monopoly power.

4. Intuitive's Monopoly Power Is Corroborated by Industry Participants

136. The conclusion that Intuitive's da Vinci robot has had monopoly power had been corroborated by numerous industry participants. This includes academic journals and books, Wall Street analysts, Intuitive's internal documents, and hospital staff including surgeons. A 2019 book noted that "the da Vinci Surgical System is the only commercially available equipment fulfilling the key concepts of surgical robots in the field of laparoscopy."[329] Journal articles noted that Intuitive's seeming or effective monopoly position has enabled it to "enjoy significant price control,"[330]

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https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1676444 (accessed 10/17/2022) ("The razors-and-blades story offers a foundational understanding of a key area of economics and strategy: Invest in an installed base by selling the razor handles at low prices or even giving them away, then sell the razor blades at high prices to justify the prior investment.").

[327] Intuitive-01019873 (email between Katie Scoville and Ryan Shaw stating another reason to phase out the Si is due to IRC repair). *See also*, Intuitive-00114506-510 and Intuitive-00563955-962 (letters regarding S/Si-compatible instrument phase-out suggesting Xi-compatible instruments as an alternative) and Intuitive-00331265 (email discussing Si system end-of-life including end of manufacture/sales/service and sales "converted to GEN4 [da Vinci X/Xi/SP]").

[328] Intuitive-00246469-491 at 489 ("… a frustration felt due to the monopoly position that da Vinci has, which requires hospitals to buy equipment and maintenance for their da Vinci systems directly, with no competition that might improve pricing or generate innovation.").

[329] Douissard et al. (2019) at 13.

[330] Perez and Schwaitzberg, *Robotic surgery: finding a value in 2019 and beyond*, ANNALS OF LAPAROSCOPIC AND ENDOSCOPIC SURGERY, Vol. 4, May 2019 ("Effectively a monopoly, Intuitive has been able to enjoy significant price control over the technology.").

"command high premiums,"[331] and "control the market."[332] Wall Street analysts describe Intuitive's "dominant market position"[333] and "near-monopoly position."[334] Intuitive's customers describe a "monopoly marketplace,"[335] where Intuitive "had the market cornered for a long time resulting in overpricing."[336] Intuitive was aware of its own situation, where even after competitor entry it was "the dominant supplier,"[337] whose hospital customers "hate that we are a monopoly."[338]

D. The U.S. Market for EndoWrist Repair and Replacement Is a Relevant Market

137. As described above, surgeons use EndoWrist instruments with the da Vinci robot to perform minimally invasive soft tissue surgeries. This situation is described as having a primary (or equipment) market and an after (or secondary) market. The aftermarket is so-called "because these goods are typically purchased in a later transaction than the purchase of the underlying primary good."[339]

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[331] Abhishek Trehan and Tristan J. Dunn, *The robotic surgery monopoly is a poor deal*, THE BMJ, Vol. 347, 2013, 1-2 at 1 ("Intuitive Surgical can command high premiums seemingly because of its monopoly position as the sole supplier of soft tissue robotic surgical equipment.").

[332] Riccardo Autorino, *Robotic Surgery Systems in Urology: What's in the Pipeline*, GRAND ROUNDS IN UROLOGY, February 7, 2018, https://grandroundsinurology.com/robotic-surgical-systems-in-urology/ (accessed 8/30/2022) ("Certainly, one big issue with robotic surgery is that we have only one company. So, it's a monopoly that is in charge to control the market.").

[333] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 11 at Intuitive-00566074. *See also*, FRANCISCAN-00051653-657 at 653 ("Intuitive Surgical has dominated the surgical robot market for nearly two decades…").

[334] Intuitive-00098287 at 345 ("a near-monopoly position in an area that is becoming increasingly-critical to hospitals."). *See also*, Zafar (in *In re: da Vinci*) Dep. at 16:15-21 (Intuitive has "more or less" "been a monopolist in" soft tissue minimally invasive robotic surgery), 17:23-18:6 ("they're the only game in town.").

[335] Intuitive-00141567 at 567 (Dr. William Mayfield, Chief of Surgery at Wellstar: "As a final note, the capital and carrying costs are still extremely high for Intuitive Surgical products. This has been tolerated (and I do not use the term lightly) in a monopoly marketplace.").

[336] Intuitive-00133628 at 628 ("Surgeon…Market monopoly, expensive equipment." "Hospital Administrators/Executives…they know they don't have any competition…They are not easy to work with. They have a monopoly." "OR Staff…Expensive & had the market cornered for a long time resulting in overpricing." "Robotic Coordinator…expensive and have a monopoly on most robotic supplies.").

[337] Intuitive-02068246 at 269.

[338] Intuitive-00113020. *See also*, Intuitive-00029346-47 ("Surgeons don't like the monopoly.").

[339] IIA AREEDA & HOVENKAMP, ANTITRUST LAW, ¶564b (Wolters Kluwer IntelliConnect CCH Edition, 2016) ("An aftermarket is a type of derivative market consisting of consumable goods or

138. Here, the alleged aftermarket is for the repair and replacement of EndoWrists.[340] The repair and replacement of EndoWrists are related because when EndoWrists cease to function, they can be replaced either with new EndoWrists or with repaired EndoWrists. During the relevant time period, Intuitive never itself sold repair service or repaired EndoWrists.[341] Instead, Intuitive just replaced EndoWrists which broke before hitting their use-counter limit with new ones, crediting the unused part of the use-counter on the first one.[342] As such, from an economic perspective, one can describe the market as being one in which Intuitive only sold new replacement EndoWrists and rivals sold repairs or repaired EndoWrists that provided an alternative replacement.[343]

139. In this section, I will establish or show several things: (1) EndoWrist replacement (via either new or repaired EndoWrists) is a separate product from the original purchase of the da Vinci; (2) new replacement EndoWrists and repaired replacement EndoWrists are substitutes that belong in the same market, and because that substitution also extends to new initial EndoWrists, they are also in the relevant market; (3) there are no reasonable substitutes for replacing EndoWrists with either new or repaired EndoWrists; (4) EndoWrist repair and replacement is a relevant market; and (5) the relevant geographic market is the U.S.

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replacement components that must be used for the proper functioning of some primary good. We describe these as 'after' markets because these goods are typically purchased in a later transaction than the purchase of the underlying primary good. For example, the purchase of a Xerox photocopier generates aftermarkets for at least the following: (1) repair service, (2) replacement parts, (3) paper, (4) ink cartridges or their equivalent, and (5) personnel to operate the copier.").

[340] *See* CAC ¶¶ 2, 6, 91, 99-103, 106, 158.

[341] *See* Scoville (in *Restore*) Dep. at 9:25-10:3 ("Q. And at any point did Intuitive start to refurbish the core instruments for the Si in the United States for its customers? A. No."); Katie Scoville 5/26/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 11:23-13:15 (Intuitive considered refurbishing EndoWrists but never did so).

[342] *See, e.g.*, Intuitive-00019658 at 659 ("Credit for defective returns: Intuitive Surgical will issue credit on products based on failure analysis performed and individual warranty terms. For instruments, credit will be issued for the remaining lives, plus one additional life to compensate for usage at the time the issue was identified.").

[343] As noted above, while the distinction between selling EndoWrist repairs and selling repaired EndoWrists may matter for certain regulatory issues, the two are economically equivalent, providing the same ultimate replacement with a repaired EndoWrist. *See supra* Section I.C.2.

1. EndoWrist Repair and Replacement Is a Separate Product from MIST Surgery Robots

140. As I noted in Section II.A above, defining a relevant product market is an important step toward the goal of assessing the allegations of harm. Here, the alleged restraints include a "requirements tie" that had required buyers of the da Vinci robot (the tying product) to purchase *all* EndoWrists from Intuitive and to forego having *any* EndoWrists repaired by third parties.[344] The alleged restraint also ties da Vinci robots to a restraint on rival EndoWrist repairs by requiring da Vinci buyers to replace EndoWrists with new EndoWrists faster than needed, which restrains buyers from instead replacing their EndoWrists with repaired EndoWrists.[345] Thus, one must evaluate whether the allegedly tied service or product is *separate* from the allegedly tying product, at least for economic tying analysis.

141. To begin with, Intuitive and third-party analysts treat EndoWrists and da Vinci robots as separate products. Intuitive lists "Instruments and Accessories" separately from the "da Vinci Surgical System" (i.e., its MIST surgical robot) in its financial reports and on its website.[346] Glenn Vavoso, a Senior Vice President General Manager at Intuitive, noted that EndoWrists are purchased separately from da Vinci surgical robots.[347] Intuitive also records da Vinci and EndoWrist transactions separately.[348] EndoWrist repair was likewise sold separately from da

[344] See, e.g., CAC, ¶¶ 107, 130-131, 186-197.

[345] *See*, e.g., CAC, ¶¶ 130-147. I also explain below in Part III that the economic evidence shows Intuitive's restraints against third-party repairs and servicing *do in fact* function as requirements ties (i.e., the plaintiff's allegations correctly reflect the economic nature of the challenged conduct).

[346] *See*, e.g., Intuitive Surgical Form 10-K, FY2020, at pp. 5-7. Intuitive Surgical, *Da Vinci by Intuitive*, https://www.intuitive.com/en-us/products-and-services/da-vinci (accessed 7/25/2022) (listing systems, software, instruments, stapling, energy, vision, education and training, and support and analytics)

[347] Vavoso (in *Rebotix*) Dep. at 50:20-51:9 ("Q. The customer has to purchase instruments and accessories separately from the actual da Vinci robot, right?...THE WITNESS: Over time, after they've made the initial da Vinci purchase, they're – ongoing they're purchasing instruments to be used with the system. MR ERWIG: Q. So the purchase of those ongoing instruments, you're not buying an additional robot each time, right? You're just buying new EndoWrists for the robot that you already own; is that right? A. You're not buying a robot each time, correct.").

[348] Intuitive Instrument & Accessory Transaction Data; Intuitive Robot Transaction Data. Intuitive's responses to questions about the Instruments and Accessories data notes that the order type field has a value of "ZOS" for system sales. *See* Intuitive Responses to Class Plaintiffs' Data Questions for Intuitive, November 4, 2022. There are no entries in the Instruments and Accessories data since at least the start of the class period with an order type field value of ZOS. *See* Intuitive Instrument & Accessory Transaction Data.

Vinci robots. Indeed, Intuitive sold the da Vinci robot, but never sold repaired EndoWrists or EndoWrist repairs. Conversely, third-party IRCs sold repaired EndoWrists, but never sold da Vinci robots.[349] Third-party analyst Pharma Intelligence likewise treat robots and instruments/accessories as separate segments.[350] A fortiori, the fact that Intuitive and market analysts treat da Vinci robots as separate products from EndoWrists means that they also treat da Vinci robots as separate products from EndoWrist repair.

142. In antitrust economics, whether two products are "separate" for the purposes of analyzing a tie depends on the economic facts that are relevant to whether such a tie can impose anticompetitive effects. The economic literature (including the treatise on tying that I co-authored) has identified a set of tests that can be used to determine whether two products should be considered "separate" for the purposes of tying analysis.[351]

143. Here, the economic evidence indicates that EndoWrist repair and replacement are "separate" from da Vinci sales (for the purposes of analyzing Intuitive's alleged requirements tie) because: (i) it would have been and was feasible to sell the products separately; (ii) many hospitals have found it desirable to obtain the products separately; and (iii) the challenged tie has *not* been commonplace in other markets.

i. It Was Feasible to Sell da Vinci Robots Separately from EndoWrists and Their Repair

144. Two products are not "separate" for the purpose of analyzing a requirements tie if it would not be *feasible* for sellers of the tying product to sell the products separately.[352] Here, separate sales would involve Intuitive selling da Vinci surgical robots without any requirement to buy EndoWrists or EndoWrist repair from Intuitive and without limits on EndoWrist uses that restrain rival repair sales.[353]

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[349] *See supra* Section II.C.1.i.

[350] Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in "Soft Surgery Robotics,"* April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022), at 3.

[351] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1744-50 (1996).

[352] *Id.*, at ¶ 1743b ("Threshold proof of seller ability to unbundle should also be required. If unbundling is not physically or economically feasible, there is no point in ordering firms to unbundle.").

[353] *See infra* Section III.

Because the tie is imposed contractually and through Intuitive actions taken after-the-fact of a da Vinci sale, there is no physical or practical sense in which the allegedly tied product (EndoWrist repair and replacement) cannot be separated from the tying product (da Vinci robot). Intuitive merely needs to not implement its tying restraints, which is entirely feasible.

145. It has clearly been feasible to sell da Vinci surgical robots without restraints tying them to Intuitive sales of EndoWrists. Intuitive has in fact sold EndoWrists separately from da Vinci surgical robots.[354] Indeed, Intuitive's da Vinci sales contracts provide that "Instruments and Accessories will be made available to Customer from Intuitive pursuant to ***separate*** orders placed by Customer to Intuitive from time to time."[355] This reflects the reality that, as Intuitive's representative testified, customers purchase a da Vinci robot up front and then make ongoing instrument purchases.[356] Buyers can be and have been charged separately for the da Vinci robots and EndoWrists, and Intuitive has recorded these charges separately.[357] Third party IRCs have not sold MIST surgery robots, so by definition they have sold EndoWrist repair separately from robots.

146. EndoWrist replacements and repair have also been priced separately from da Vinci robots and those separate prices can and have changed over time.[358]

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[354] Vavoso (in *Rebotix*) Dep. at 50:20-51:2. *See also,* Intuitive-00005135 at 144-146.

[355] Vavoso (in *Rebotix*) Dep. Ex. 24 at Intuitive-00067542 (emphasis added). This same language appears in paragraph 8 of all of Intuitive's contracts with buyers. *See* Vavoso (in *Rebotix*) Dep. at 198:18-199:2 ("MR. ERWIG: Q. This paragraph, paragraph 8, does this appear in each of the sales contracts that Intuitive has with hospitals who purchase the da Vinci surgical robot? A. To my knowledge, yes. Q. […] As Intuitive's 30(b)(6) witness, can you identify any sales contract with the hospital that does not include the language in paragraph 8? A. No."); *see, e.g.,* Intuitive-00299311 at 314; Intuitive-00005135 at 137; Intuitive-00204014 at 016; Intuitive-01989020 at 028-029; Intuitive-01846020 at 022.

[356] Vavoso (in *Rebotix*) Dep. at 50:20-51:9 ("Q. The customer has to purchase instruments and accessories separately from the actual da Vinci robot, right?...THE WITNESS: Over time, after they've made the initial da Vinci purchase, they're – ongoing they're purchasing instruments to be used with the system. MR ERWIG: Q. So the purchase of those ongoing instruments, you're not buying new EndoWrists for the robot that you already own; is that right? A. You're not buying a robot each time, correct.").

[357] Intuitive Instrument & Accessory Transaction Data; Intuitive Robot Transaction Data.

[358] Intuitive's da Vinci sales contracts provided that "Instruments and Accessories will be made available to Customer from Intuitive pursuant to *separate* orders placed by Customer to Intuitive from time to time in accordance with the *terms* and conditions contained in the *then current* Instrument and Accessory Catalog." *See, e.g.,* Vavoso (in *Rebotix*) Dep. Ex. 24 at Intuitive-00067542 (emphasis added); Intuitive-00299311-326 at 314; Intuitive-00005135-147 at 137;

The prices that a customer pays for EndoWrists accordingly have not been fixed for the life of any individual da Vinci robot. This is significant because a da Vinci robot is a durable good capable of being used for seven years for over a thousand surgeries.[359] In contrast, many EndoWrists have had a counter that limited them to be used in no more than ten surgeries.

147. Furthermore, the assortment of EndoWrists (replacement or repaired) used varies by procedure and customer. EndoWrist sales do not occur in fixed proportion to the robot. Different hospitals do different numbers and types of surgeries.[360] Even within a given type of surgery, a variety of number and types of EndoWrists may be used.[361] This results in a variable ratio of both EndoWrists and service per da Vinci robot. As Intuitive's retained expert Dr. Loren Smith indicated, "different hospital systems are going to require different numbers of instruments to meet their surgical needs."[362]

ii. Many Hospitals Have Desired to Buy EndoWrist Repair and Replacement Separately from da Vinci Surgical Robots

148. Two products are not economically "separate" for the purpose of analyzing a tie if there is no buyer demand to purchase them separately.[363] As described in this section, there has been demand from hospitals to purchase EndoWrist repairs (and thus replacement with repaired EndoWrists) separately from

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Intuitive-00204014-025 at 016; Intuitive-01989020-038 at 028-029; Intuitive-01846020-034 at 022. For example, in 2014 Intuitive lowered its prices for Instruments and Accessories associated with 5mm EndoWrists. Intuitive-00950949-951; Intuitive-00950952; Intuitive-00950953-968; Intuitive-00950969-970.

[359] GENERAL SURGERY NEWS, *In the News*, May 22, 2015, https://www.generalsurgerynews.com/In-the-News/Article/05-15/Doing-the-Math-Can-the-Robot-Be-Cost-Effective-for-General-Surgery-/32395 (accessed 11/20/2022) ("The lifetime of a da Vinci robot is a maximum of seven years."); Intuitive-00240550-638 at 603 (based on the number of quarterly procedures, Xi systems average over 240 and Si systems average over 200 procedures per year). *See also*, Intuitive-00701343.

[360] *See*, e.g., Intuitive-00895698 at 715 ("Example: Orlando Regional Hospital" mix of procedures), 720 ("Example: Memorial Sloan Kettering Cancer Center" mix of procedures),

[361] See, e.g., Intuitive-00143958 at 979-980.

[362] Loren Smith Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), at 243:8-15.

[363] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1743a (1996) ("If no buyers want the unbundled items, then [more detailed inquiry] is pointless. Nothing useful could be accomplished by condemning the bundle, because no unbundled items would in fact be purchased. Nor would anything useful be accomplished if the number of buyers interested in buying unbundled comprise an insignificant share of the tied market.").

the da Vinci robot and without the tying restraints requiring them to instead purchase new replacement EndoWrists from Intuitive.

149. In spite of Intuitive's prohibitions, many hospitals did opt to purchase EndoWrist repair services from third-party IRCs instead of buying new replacement EndoWrists from Intuitive, and others desired to do so but refrained from it out of fear of Intuitive. Hospitals purchased such third-party EndoWrist repair from Restore, Rebotix, and SIS.[364] Intuitive itself was aware of this, noting that 18 U.S. accounts were "affected" by third-party companies reprogramming da Vinci Si instruments.[365]

150. Hospital interest in EndoWrist repair was based, in part, on the potential for significant cost savings. For example, Rebotix advertised that its list price for EndoWrist repair was, on average, a 45% discount relative to the list price of a new EndoWrist.[366] Rebotix advertised that hospitals could save over $100,000 per robot per year if they bought repaired EndoWrists from Rebotix,[367] and some hospitals achieved these savings by doing so before later acquiescing to Intuitive's restraints against such purchases from rivals.[368] Similarly, the savings from purchasing repaired EndoWrists from SIS were so large that Kaiser gave an award to the employee who discovered that possibility.[369]

151. Many other hospitals indicated their interest in purchasing EndoWrist repair from Intuitive's rivals if they had been given the choice. A Wall Street analyst report indicated there was an "abundance of first-hand confirmation from hospital customers that are exploring refurbished instruments."[370] Clif Parker, CEO of Restore, noted that Restore had "many interested customers" for its repaired

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[364] Restore-00055935; Restore-0055937; Restore-00055938; Restore-0055939; REBOTIX175326; SIS000167; SIS000171.

[365] Intuitive-00194074 at 077.

[366] Papit (in *Rebotix*) 30(b)(6) Dep. at 179:10-16 ("Q Do you see the second bullet says: On average savings of 45 percent or more compared to OEM product? A I do. Q How was that figure calculated? A Based on Intuitive's published price list and our published price list."). *See also*, Papit (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at REBOTIX068496.

[367] Restore-00009347; Restore-00009348-359 at 350 ("Hospitals can save $100,000 per year per robot by repairing and re-using da Vinci endoscopic instruments.").

[368] REBOTIX067602 ("Pretty nice, savings annualized to 100K"); REBOTIX067603 (showing savings for Oct-Dec 2019 of $24,530).

[369] Greg Posdal 11/1/2022 30(b)(1) Dep. (Surgical Instrument), *Surgical Instrument Service Co. v. Intuitive Surgical, Inc.*, No. 3:21-cv-3496 (N.D. Cal.), at 77:22-78:11.

[370] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 11 at Intuitive-00566055.

EndoWrists who are deterred by Intuitive's anticompetitive restraints.[371] Of the 100+ customers for which Medline offered EndoWrist repair, "only about 5 or 10 percent" of hospitals had a clinical objection to using repaired EndoWrists, but the "vast majority" were concerned with "what any type of use of a repaired instrument would mean towards a – a service agreement or anything already in place [] with Intuitive."[372]

152. Intuitive's warnings and threats, which forced hospitals to stop using Restore's or Rebotix's services, are further evidence of buyer demand for EndoWrist repair services from IRCs. If there were no demand for purchasing such repair services from rivals, there would have been no rational economic reason to make such warnings and threats. However, Intuitive sent such warnings and threats to numerous hospitals.[373] For example, Intuitive admits in its answer to the complaint that it threatened Ardent Health Services about using repaired EndoWrists.[374]

iii. It Has Been Common for Firms Not to Tie MIST Surgery Robots (or Other Devices) to Aftermarket Instruments and Their Repair

153. When separating two items is feasible and desired by some buyers, the fact that many firms in similar markets do not bundle those items indicates that the

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[371] Declaration of Clif Parker, 12/10/2021, in *Restore v. Intuitive,* Case No. 5:19-cv-55-TKW-MJF ("Parker Declaration"), at ¶ 4.

[372] Jake Colletti 5/27/2021 Dep. (Medline Industries), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 9:19-11:7.

[373] Pacific Coast Surgical Center (Intuitive-00019774), Conway Regional Medical Center (Intuitive-00032916; Intuitive-00157064), Crescent City Surgical Center (Intuitive-00044524), Pullman Regional Hospital (Intuitive-00044528), Hospital Corporation of America (Intuitive-00047082), Jackson Madison County General Hospital (Intuitive-00049014), Panama City Surgery Center (Intuitive-00211776; Intuitive-00373839), Marin General Hospital (Intuitive-00373885), BSW Health (Intuitive-00373885), Ardent Health Services (Intuitive-00562853), Lowell General Hospital (Intuitive-00569180), Indiana University Health Bloomington Hospital (Intuitive-00569308); UNC health (Intuitive-00009500); Steward (Intuitive-00009994); Citizens Medical Center (Intuitive-00044508), White County Medical Center (Intuitive-00048760), McLaren Greater Lansing and McLaren Bay Region Hospital (Intuitive-00044535, Intuitive-00478591, Intuitive-00048723), Evergreen Healthcare (Intuitive-00048911).

[374] Answer to Complaint, 1/18/2022, ¶ 82 ("on January 17, 2020, [Intuitive SVP and General Counsel] Kara Andersen Reiter and [Intuitive VP] Romain Denis notified Ardent Health Services that Intuitive "understand[s] that Ardent Health Services is using or considering using 'refurbished' EndoWrist® instruments, obtained from and/or modified by a third party for use beyond the programmed number of uses" and that '[b]ased on the terms of the Agreement and the patient safety implications of the Systems being used with instruments refurbished by an unauthorized third party, Intuitive may no longer accept your service calls for such Systems.'").

tying and tied products are "separate" products, and it would so indicate even if some other firms did bundle them. If it is common for some firms to abstain from bundling two products in *competitive* markets, that strongly indicates that it is efficient for firms not to bundle them and thus indicates separate products. The reason is that, in competitive markets, firms cannot survive while using inefficient strategies.[375] If it is common for some firms not to bundle the items even in *non*competitive markets, that also indicates that it is efficient not to bundle the items and thus indicates separate products, though the inference about efficiency is somewhat weaker because weaker competition could allow inefficient firms (or inefficient strategies) to survive longer.[376] In contrast, the fact that firms with market power do bundle two items does not provide any indication about the efficiency of doing so because firms with market power can profit from tying two products anticompetitively, even if the practice is inefficient.[377] Finally, if a dominant firm bundles two items and the competitive fringe within that same market does not, then that suggests the two items are separate products because the competitive fringe firms would have economic incentives to bundle the items if it were efficient to do so.[378]

154. In this case, unbundling has been common within the U.S. MIST surgery robot market, which supports a conclusion that the products are in separate markets. Intuitive's rivals in the U.S. MIST surgery robot market have allowed instruments and accessories to be sold separately from the robots. Both rivals advertise the fact that one can purchase instruments and accessories from third

[375] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744e (1996) (suppose "many sellers in the competitive analogue sell the items unbundled but many others sell them bundled only… the market test indicates separate products on balance.").

[376] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744g (1996) ("unbundling in a noncompetitive market analogue implies separate products under the market practice tests. The inference is somewhat weaker than when [un]bundling occurs in competitive markets that require efficiency for survival.").

[377] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW, ¶1744g (1996) ("Sometimes the relevant market analogues are monopolies or oligopolies. Bundling in such a noncompetitive market carries no single product implication. Although such bundling may reflect efficiencies, it may also exploit market power or suppress competition.").

[378] *See* X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744g (1996) ("unbundling in a noncompetitive market analogue implies separate products under the market practice tests."); *id.* ¶ 1744c4 (in contrast, if all the competitive fringe did bundle as well, "the bundle should be treated as one product, at least absent affirmative evidence that the fringe competitors are bundling only because of oligopolistic discipline").

parties for use with their robot.[379] A Wells Fargo equity research report described the Medrobotic's Flex system as offering "an 'open architecture' instrumentation that contains two working channels to accommodate a variety of third-party instruments."[380] Senhance also indicated that its compatible instruments are "fully reusable" and "do[] not have a limited lifespan."[381]

155. Evidence that unbundling has been common in other similar medical device markets also suggests separate products. Take, for example, medical devices for performing manual laparoscopy. Manual laparoscopic instruments have "very, very similar" materials and components to EndoWrists, except that laparoscopic instruments used handles rather than activating cables.[382] These laparoscopic instruments have been routinely repaired by a separate company than the one that sold the instrument, often by the hospitals themselves.[383] Rebotix's founder has had

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[379] Senhance, *The Senhance Surgical System*, https://www.senhance.com/us/digital-laparoscopy (accessed 11/23/2022) ("The Senhance Surgical System removes the economic limitations of current robotic systems with standard reusable instruments and an open-platform architecture strategy."); Asensus Surgical, Inc. Form 10-K FY2020 at p. 9 ("We also have designed the Senhance System so that third- party manufactured instruments can be easily adapted for use."); Intuitive-00111283-287 at 286 ("Why Senhance?...Open Platform: you can add other vision or instruments."); Medrobotics, *Flexible 'open architecture' instrumentation*, https://web.archive.org/web/20151017155810/http://medrobotics.com/gateway/instruments/ (accessed 11/23/2022) ("The Flex Robotic System contains two working channels to accommodate a wide variety of third party instruments.")

[380] Intuitive-00084987-5028 at 017.

[381] TransEnterix, *Fact Sheet: Senhance Surgical System Highlights*, https://asensus.com/sites/default/files/media-kit/TRX%20fact%20sheet_2018_u.pdf; Elizabeth Cairns, *Intuitive finally gets some US competition*, EVALUATE, October 16, 2017, available at https://www.evaluate.com/vantage/articles/news/intuitive-finally-gets-some-us-competition ("The instruments employed with Senhance can be reused thousands of times."); Longmore et al. at p. 16; Intuitive-00113298-299 at 299 ("TransEnterix offering unlimited life instruments.").

[382] Greg Posdal 5/10/2021 Dep. (Surgical Instrument), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 12:17-13:18.

[383] Dickens (in *Restore*) Dep. at 31:20-21 ("…I've used plenty of repaired laparoscopic instruments."); Harrich (in *Rebotix*) Dep. at 32:16-20 ("Q. … Does your hospital repair and use over and over traditional laparoscopic instruments, scissors, forceps? A. Yes, we do."), 34:2-7 ("Q. Based on the hospitals you know, it is standard procedure to repair and reuse traditional laparoscopic devices that are similar to the EndoWrist used in da Vinci surgeries; is that right? . . . THE WITNESS: That's correct."); Donovan (in *Rebotix*) Dep. at 29:14-18 ("Q. Is it standard procedure at Evergreen to repair reusable instruments used in traditional nonrobotic surgeries? MR. BAILEY: Objection to form. THE WITNESS: Yes, it is."), 30:3-6 ("Q. Are you aware of any hospitals in the industry that wouldn't repair reusable, traditional laparoscopic instruments as needed? A. I'm not aware of any."); Madewell (in *Restore*) Dep. at 23:25-24:6 ("And so if we

a separate IRC that repaired medical instruments manufactured by other firms and used in traditional laparoscopy, such as the Ethicon Harmonic Scalpel.[384] An Intuitive-commissioned survey of customers found that 57% were at a hospital that is "currently participat[ing] in a refurbishment program for surgical instruments."[385]

156. The fact that it has been common for medical device firms not to bundle those devices to aftermarket repairs is also demonstrated by the well-established existence and size of independent service organizations ("ISOs"). A 2018 FDA report "conclude[d] that the estimated total number of firms performing medical device servicing in the U.S. is between 16,520 and 20,830."[386] The prevalence of these types of firms shows that, as a general matter, medical device manufacturers have not universally tied the sale of their devices to limits on repairs by rival firms.

2. Replacement with Repaired EndoWrists Is a Substitute for Replacement with New EndoWrists, So the Market Includes Both EndoWrist Replacement and Repair

157. From an economic standpoint, when an EndoWrist is no longer functioning, customers had two possible ways of replacing it: with a new EndoWrist or with a repaired EndoWrist.[387] Intuitive and IRCs both indicate that repaired EndoWrists are functionally equivalent to new EndoWrist replacements.[388]

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could reprocess or repair these instruments and save money on those, then – much like a lot of instruments that we send out for reprocessing, whether they're single use or multi-use, if they can be reprocessed and used again at a lower cost, then we do that.").

[384] Benjamin Biomedical, *Medical Instrument Repair Services*, https://benjaminbiomedical.com/repair-services (accessed 8/3/2022).

[385] Intuitive-00566507-543 at 508, 517.

[386] U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/media/113431/download (accessed 7/29/2022).

[387] While a hospital could, in theory, purchase partially used EndoWrists from other hospitals via a gray market, apparently this gray market also ran afoul of Intuitive's contractual restraints. *See, e.g.*, Madewell (in *Restore*) Dep. at 119:8-12 ("Only the hospital or facility that buys that instrument can use that instrument. You are not allowed to buy instruments from another hospital because we're [Intuitive] not going to support them at your facility."). Consistent with this, I have seen no evidence that hospitals were able to circumvent Intuitive's contractual restrictions by purchasing significant volumes of EndoWrists through a gray market.

[388] Scoville (in *Rebotix*) Dep. at 105:1-19 and Ex. 7 at Intuitive-00103429; Bair (in *Rebotix*) Dep. Ex. 5 at Intuitive-00042946; *id.* at 50:17-51:5 ("Q. Was it your understanding that refurbished instruments could offer equivalent performance to new instruments? […] THE WITNESS: Following certain robust remanufacturing or refurbishment techniques, including the replacement of components, we did deem that it was likely feasible, although we did not undertake a full

EndoWrist repairs can also extend the useful life of existing EndoWrists owned by a hospital in a way that can put off the need to replace them with new EndoWrists.[389] Because repaired EndoWrists are an economic substitute for replacement with new EndoWrists, repairs and replacement are in the same market.

i. EndoWrist Repairs Constrain the Pricing of New EndoWrist Replacements

158. EndoWrist repairs and replacement with new EndoWrists are economic substitutes for each other because they constrain pricing for one another. This can be established qualitatively and quantitively.

159. Intuitive's own analysis and engaged experts have indicated that EndoWrist repair puts competitive pressure on EndoWrist replacements. Intuitive's counterclaim damages against third-party repair companies have been premised, in part, on the fact that EndoWrist repair steals business from replacement with new EndoWrists.[390] Intuitive's engaged expert wrote, "[i]t is my opinion that each 'repair' by Rebotix (and its distributors and agents) effectively displaced one new

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validation and verification of refurbished or remanufactured instruments. BY MR. ERWIG: Q. You certainly didn't conclude that refurbishment was not possible; right? A. That is correct."). *See also*, Tyler McDonald 5/21/2021 Dep. (Conway Regional Health), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.) at 13:20-17:25 (e.g., "Q Did Conway observe any problems with the quality of the refurbished instruments? A No."), 67:22-68:15 (e.g., "Q How many times was the – well, strike that. What happened in the trial? Can you walk me through it? A Yes. We met with, I believe, probably three – three of our surgeons, one urologist and two gynecologists, that were heavy da Vinci volume drivers and discussed the potential for cost savings and asked them if they would be willing to try out the refurbished instrumentation, which they accommodated and tried out and gave us feedback that they couldn't tell any difference between that and the other instruments that came directly from Intuitive."); Harrich (in *Rebotix*) Dep. at 36:14-40:2-8 (e.g., "Q. What did you do to test or try out Rebotix-repaired EndoWrists? A. We had three or four samples that we were given by Rebotix, and informed the physician that it was a reprocessed robotic instrument for the cases, made everybody in the room aware that it was a reprocessed instrument, and gave it a whirl. There were no complaints. Everybody said they worked just fine. There was no difference than the non-reprocessed instruments.").

[389] The term "repair" should also be understood to include other repairs such as sharpening, whether or not incidental to resetting the usage counter.

[390] *Rebotix Repair LLC v. Intuitive Surgical*, 8:20-cv-02274-VMC-TGW, April 2, 2021, Defendant's Answer, Affirmative Defenses and Counterclaims, at Counterclaims ¶ 72 ("…customers who should be ordering replacement EndoWrist instruments when it is time to do so are instead turning to Rebotix's so-called 'repair' services."). *See also*, Intuitive-00139149-150 at 150 (In a presentation about "Remanufactured Instruments," Intuitive noted that "Rebotix has potential to impact Si sales, an immediate threat.").

instrument sale by Intuitive."[391] This "displacement" is the cornerstone of competition, with the threat of losing business to a rival spurring companies to lower prices or raise quality.

160. Industry commentators have agreed that EndoWrist repair is a substitute for, and competitive threat to, EndoWrist replacement. Deutsche Bank indicated that third-party EndoWrist repair is a "competitive threat" to Intuitive's sales of instruments and accessories.[392] Deutsche Bank also wrote that they believe that "[g]iven the abundance of first-hand confirmation from hospital customers that are exploring refurbished instruments, the question is not whether – but rather, how much – Intuitive's business will be impacted."[393]

161. Direct evidence of the ability of rival EndoWrist repair to constrain the pricing of EndoWrist replacement can be seen below in Section VI on competitive effects. As described in in Section VI.B, evidence shows that Intuitive would have had to lower its EndoWrist replacement prices had it been faced with unfettered competition from IRC EndoWrist repair.

ii. The Scope of "Replacement" EndoWrist Price Competition

162. The scope of competition between EndoWrist repair and replacement has two dimensions: product and customer. In other words, which products would have had a competing EndoWrist repair option and which customers would have benefitted from lower prices. I address each of these in turn below.

163. Third party IRCs have indicated that they were prepared to repair essentially the full range of EndoWrist instruments for the S, Si, X, and Xi robots (excluding training instruments, one-use instruments, and staplers).[394] Rebotix and Restore each have developed their own method for repairing EndoWrists that are compatible with the da Vinci S and Si models.[395] While awaiting the outcome of litigation against Intuitive, Rebotix and Restore have both been developing a method

[391] Expert Report of Loren K. Smith, Ph.D., July 26, 2021 in *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274 (Document 108-20 filed 12/01/21).
[392] Intuitive-00552993-53014 at 52993.
[393] DeSantis (in *Rebotix*) Dep. Ex. 11 at Intuitive-00566055.
[394] Parker (in *In re: da Vinci*) Dep. at 152:9-153:3; May (in *In re da Vinci*) Dep. at 76:3-77:12; Hamilton (in *In re: da Vinci*) Dep. at 22:13-26:20.
[395] Papit (in *Rebotix*) 30(b)(6) Dep. at 59:14-18, 66:23-67:3; Parker Declaration, at ¶ 3; Parker (in *In re: da Vinci*) Dep. at 130:2-23.

for repairing X- and Xi-compatible EndoWrists.[396] Without the anticompetitive restraints, firms would have had economics incentives to have undertaken these efforts even earlier in the but-for world, and is confirmed by firm testimony.[397]

164. The evidence in this case indicates that competition in the EndoWrist repair and replacement market would have broadly benefitted Intuitive's customers. Intuitive communicated to at least one hospital that it "has [had] a strong one-price policy" "since 1999."[398] This is reflected in Intuitive's sales data, which records that during the Class Period the price paid equaled the list price for approximately 98% of transactions and the average aggregate discount from the list price was a fraction of one percent.[399] That conclusion is confirmed by Intuitive's economic expert in the *Rebotix* case, who found that "when looking across all of Intuitive's instruments sold during 2019, on average, 98% of customers paid the same price for the specific instrument."[400] Likewise, Marshall Mohr, former CFO and current executive vice president global business services at Intuitive, testified that "we have a list price, we generally sell [at] that list price," other that providing certain additional discounts, which are generally volume-based discounts.[401] This evidence indicates that

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[396] Hamilton (in *In re: da Vinci*) Dep. at 42:1-11 ("So from a technical perspective today – as of today, Rebotix has figured out how to reset the usage counter for Xi instruments. Is that what you're saying? [...] THE WITNESS: I agree. Yes."); Clif Parker 10/25/22 Dep. at 132:7 - 142:12.

[397] May (in *In re: da Vinci*) Dep. at 75:16-76:1 ("Q. Thank you. Did that harm cause any delay to Restore's business? […] THE WITNESS: Well, it absolutely caused delays and harm to our business. We had been counting on the revenues that we were generating from the repair business to fund being able to do additional R&D efforts, to grow the business, and to grow the Xi business and to do the research and development for the Xi."); Hamilton (in *In re: da Vinci*) Dep. at 24:5-19 ("Q: Would the scope of reparable endoWrists have expanded in a world without Intuitive's anticompetitive conduct? […] THE WITNESS: Well, clearly, the big expansion we've already talked about would be Xi. And beyond that, there would have been a lot of process implementation which would have expanded. So I think I'm separating process capability and process implementation. Yes, I believe the process implementation would have expanded significantly and more kinds of instruments would have started turning over, including Si, and then, of course, for Xi that would have been a big, big increase in the number of instruments that were turning over."); Keith Johnson 10/27/2021 30(b)(1) Dep. (Surgical Instrument), *Surgical Instrument Service Company v. Intuitive Surgical*, Case 3:21-cv-03496-VC (N.D. Cal.), at 49:4-10 ("Q Had you seen the Rebotix booth [where SIS first learned about EndoWrist repair] a couple of years earlier, let's say 2016, would SIS have been interested in the EndoWrist repair business then? […] THE WITNESS: A hundred percent.").

[398] Intuitive-00203904-906 at 905.

[399] Intuitive Instrument & Accessory Transaction Data; Intuitive List Prices from Agile Price Matrices.

[400] *See* Loren Smith (8/30/21) Rebotix Report ¶ 115.

[401] M. Mohr (in *In re: da Vinci*) Dep. at 10:1-11, 19:23-20:12.

Intuitive charged all customers the same price, with the rare exception of small incentive-based discounts, usually related to volume, rather than price discriminating among different customers.[402] This price uniformity in turn shows that any price reduction caused by competition would have been broadly enjoyed across the customer base.

iii. Replacement EndoWrists Also Substitute for New Initial EndoWrists in a Way That Puts Both in the Same Relevant Market

165. A market that includes EndoWrist replacement will also include new initial EndoWrist sales. New initial EndoWrists and new replacement EndoWrists are identical to each other and therefore in the same product market. Further, Intuitive charged the same price for initial and replacement sales of EndoWrists.[403] Given that reality, a restraint on selling EndoWrist repairs and repaired EndoWrists that inflated prices for new replacement EndoWrists would also inflate prices for new initial EndoWrists. Accordingly, one should include initial EndoWrists with replacement EndoWrists when evaluating antitrust market definition, market power, and anticompetitive impact. As such, a chain of substitution puts new initial EndoWrists, new replacement EndoWrists, and repaired EndoWrists all in the same market. Moreover, firms could have sold repaired EndoWrists for initial use in the but-for world to the extent that either (a) they would have obtained FDA clearance earlier in the but-for world, as one firm did in the actual world, [404] or (b) such repaired EndoWrists did not constitute a significant change to device performance that required FDA clearance to sell, as plaintiff expert Kimberly Trautman suggests.[405] If they did so, then buyers also could have purchased repaired EndoWrists for their initial EndoWrist purchases, which means that they would have competed directly with each other and thus that lower but-for prices for repaired EndoWrists would directly (even without the chain of substitution) have constrained prices for new initial EndoWrists.[406]

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[402] *Id.* Intuitive's representative testified that Intuitive does not price discriminate depending on whether a hospital was willing to purchase Rebotix's EndoWrist repair services. Vavoso (in Rebotix) Dep., at 211:9-212:16.

[403] See discussion of Intuitive's one-price policy and lack of price discrimination in Section II.D.2.ii above. Note also that EndoWrists are sold via a catalog that does not distinguish between initial and replacement EndoWrists. *See*, *e.g.*, Intuitive-00000105-128 and Intuitive-00000129-156.

[404] *See infra* Section IV.C.

[405] *See supra* Section I.C.2; Trautman Report ¶¶ 29-30, 35 (describing the regulatory framework governing what requires 510(k) clearance).

[406] See discussion of 510(k) clearance, *infra* Section IV.C.1.iii – iv.

3. EndoWrist Repair and Replacement Has Had No Other Economic Substitutes

i. There Have Been No Other Economic Substitutes for EndoWrist Repair and Replacement

166. There have been no other substitutes for EndoWrist repair and replacement. Only EndoWrists work with a da Vinci – literally nothing else could be hooked up to the da Vinci robot to perform the same surgical tasks.[407] Once an EndoWrist was no longer functional, it could be replaced with only a new or repaired EndoWrist. Thus, for all doctors performing surgeries with a da Vinci with a nonfunctional EndoWrist, there have been no alternatives to EndoWrist repair and replacement to consider and no economic substitutes that could constrain pricing.

167. Intuitive, Rebotix, Restore, and SIS have not provided any alternatives other than the replacement with new or repaired EndoWrists already discussed. No other firm has provided alternative EndoWrists that work with da Vinci.[408] Even if hospitals considered switching to a different surgical robot in order to use its instruments, such switching would be unlikely due to the enormous switching costs,[409] and would not have provided (and has not provided) any significant pricing constraint because Intuitive has monopoly power in the market for MIST surgery robots and has tied the sale of its robots to a prohibition on the use of rival replacements for EndoWrists.[410]

ii. Manual Laparoscopic or Open-Surgery Instruments Have Not Been Meaningful Substitutes for EndoWrist Instruments

168. Manual laparoscopic instruments are not a meaningful substitute for EndoWrist instruments. As noted above, manual laparoscopic instruments cannot be attached to the da Vinci for use in a MIST robotic surgery.[411] Furthermore, Intuitive does not treat manual laparoscopic instruments as a close competitor to

[407] DeSantis (in *Rebotix*) Dep. at 25:1-19, 139:22-140:9; Vavoso (in *Rebotix*) Dep. at 243:25-244:10.
[408] DeSantis (in *Rebotix*) Dep. at 23:21-24:4, 25:20-27:8.
[409] *See* discussion of doctor and hospital switching costs in Section II.C.1.ii. Furthermore, acquiring a rival system to use would necessitate additional switching costs on the part of the hospital. For example, both rival systems could cost $1 million or more (Intuitive-00111192-193 at 193 ("Higher Cost…FLEX capital $1M"); TransEnterix, Inc. Form 10-K FY2019 at 38 ("Company also recognized $1.3 million…related to a 2017 system sale for which revenue was deferred until the first clinical use.").
[410] *Supra* Section II.C.
[411] Vavoso (in *Rebotix*) Dep. at 53:17-55:16.

EndoWrist instruments. Bob DeSantis, Executive Vice President and Chief Product Officer at Intuitive, testified that "when we [Intuitive] think about our place in the market, we should be thinking about our robotic offerings versus other robotic offerings rather than lap."[412] Similarly, Stan Hamilton of Rebotix did not recall Rebotix trying to price repaired EndoWrists competitively with traditional laparoscopic instruments.[413] EndoWrist instruments used with the da Vinci are far more expensive than reusable instruments in traditional laparoscopy.[414]

169. There has been a one-way migration from traditional procedures utilizing traditional instruments to robot-assisted procedures utilizing EndoWrists. However, as described in Section II.B.1.iv above, this one-way migration is not the same as classical economic substitution. As such, manual laparoscopic or open-surgery instruments have not put competitive pressure on the price of EndoWrists.

170. The specific circumstances surrounding who pays for and who performs surgeries reduce the likelihood that a hospital would, after buying a da Vinci, substitute to traditional procedures (and instruments) based on EndoWrist prices. While patients (and third-party payors such as insurance companies) pay for surgeries, surgeons have a large influence on the instruments they use in surgery. Once surgeons have become proficient with robot-assisted surgery, they are often hesitant to go back to older methods.[415] One surgeon testified that "[w]hen you fully embrace robotics, it's very difficult to go back to laparoscopy."[416]

4. Quantitative Analysis Confirms that EndoWrist Repair and Replacement Is a Relevant Market

171. Several competitive benchmarks and yardsticks suggest that Intuitive was able to profitably implement a significant and non-transitory increase in price above the competitive level. The analysis in Section VI.B below shows there were anticompetitive increases in EndoWrist replacement prices relative to these competitive benchmarks. In Section VI.E, these are shown not to have been offset by a decrease in da Vinci prices.

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[412] DeSantis (in *Rebotix*) Dep. at 12:13-15, 29-30 ("a true robotic competitive threat" was among the "bigger considerations." "…when we think about our place in the market, we should be thinking about our robotic offering versus other robotic offerings rather than lap.").
[413] Hamilton (in *In re: da Vinci*) Dep. at 34:7-13.
[414] Pope (in *Restore*) Dep. at 25-26.
[415] See discussion of surgeon switching costs in Sections II.C.1.iii above.
[416] Dickens (in *Restore*) Dep. at 13:21-23.

172. For example, at a time when Intuitive expected to face competition from entrants selling EndoWrist repairs, Intuitive proposed offering a 20% price cut for a mixed offering of both new replacement and repaired EndoWrists.[417] This was at least in part a response to the competitive threat of third-party IRCs.[418] Intuitive was successful in using its restraints to drive out that competition, and never implemented this price cut.[419] But one can use the price cut that Intuitive contemplated it would charge with some competition as a conservatively-high indicator of what prices at a fully competitive baseline would be, leading to the conclusion that Intuitive's actual prices represented at least a 25% increase over that conservatively-high estimate of the competitive baseline.[420] This is well above the typical 5% threshold for a SSNIP test.

5. Treating Different EndoWrist Models as Being in One Market

173. Throughout my analysis, I will be describing one market for EndoWrist surgical instruments. This is for purposes of simplifying exposition. Different models are functionally different. One EndoWrist (like a cutter) is not literally a substitute for another EndoWrist (like forceps) because a surgeon is not switching from one to the other on the basis of price. They are choosing between EndoWrist models depending on the requirements of the surgical procedure. But these different EndoWrists can be treated as being in one market for purposes of my analysis because none of my conclusions change whether they are considered to be in dozens of separate markets or in one market. For example, even if they were in separate markets based on function, it would still be the case that Intuitive is the sole supplier, rival suppliers have been excluded, there are no close non-EndoWrist substitutes, and so on. As noted above, "the purpose of defining the market and measuring market shares is to illuminate the evaluation of competitive effects."[421] Accordingly, defining EndoWrist submarkets should be rejected because they would not alter the assessment of anticompetitive effects in this case.

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[417] Intuitive-00103456-478 at 458, 459.

[418] Intuitive-00273264 (a 2017 Intuitive presentation on secondary markets showing one benefit to Intuitive of entering into the secondary market (i.e., EndoWrist repair) is "[c]ombat utilization of 3rd party after market refurb or reprogrammed instruments," would "[d]isplace non-validated 3rd party re-programmers where already present" and that "[r]eclamation removes product from field increase entry barriers for other 3rd party reprogrammers.").

[419] *See infra* Section VI.B.1.

[420] 1 / 0.8 = 1.25, or 125% of the baseline price.

[421] DOJ/FTC Horizontal Merger Guidelines § 4.1.1 (2010).

174. The fact that I am treating the EndoWrists as being in one market for purposes of my analysis does not mean that X/Xi-compatible EndoWrists are close enough substitutes to constrain prices of S/Si-compatible EndoWrists, and vice versa. To the contrary, a company with a monopoly over either X/Xi-compatible or S/Si-compatible EndoWrist repair and replacement could profitably raise price 5-10% above the competitive level because that price increase would still be smaller than the switching cost of acquiring a new da Vinci robot that would work with the EndoWrists whose price had not been inflated.[422] For example, under the prevailing supracompetitive prices in 2021, annual instrument and accessory (including EndoWrist and more) revenue was approximately $410,000 per robot.[423] A price increase of 5-10% of this would be $20,000-$41,000.[424] The averages sale price of a da Vinci robot was $1.5 million in 2020.[425] Accordingly, the switching cost to acquire a replacement da Vinci robot would not outweigh a 5-10% instrument and accessory price increase for 37-75 years on a device capable of being used for seven years.[426] As such, to the extent it did matter for the analysis, there are distinct sub-markets for (1) X/Xi-compatible EndoWrist repair and replacement, and (2) S/Si-compatible EndoWrist repair and replacement.

6. The Relevant Geographic Market Is the United States

175. As with MIST surgery robots, the relevant geographic market for EndoWrist repair and replacement is the United States.[427] Being a "Class II medical device," EndoWrists are subject to "controls…and clearance by the FDA,"[428] and thus can be sold in the U.S. only with FDA approval. The firms that offer medical

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[422] This reflects the fact that X/Xi EndoWrists are not compatible with S/Si da Vinci robots, and S/Si EndoWrists are not compatible with X/Xi da Vinci robots. See, e.g., the separate product catalogs for S/Si-compatible and X/Xi-compatible EndoWrists (Intuitive-00000105-128; Intuitive-00000129-156; Intuitive-00360851-889). In contrast, there is no compatibility issue between X and Xi EndoWrists because the same EndoWrists used on the da Vinci Xi are compatible with the da Vinci X, and vice versa. *See supra* Section I.B.2.i. Likewise, there is no compatibility issue between S and Si EndoWrists because the same EndoWrists used on the da Vinci S are compatible with the Si, and vice versa. *Id.*

[423] $410k/robot based on $2.46 billion in instrument and accessory revenue (Intuitive-00595405) divided by an installed base of 5,989 (Intuitive Surgical, Inc. Form 10-K FY2020 at 10). For simplicity, this analysis makes the conservative assumption to use all instrument and accessory revenue rather than just EndoWrist revenue.

[424] $410k x 5% ~= $20.5k; $410k x 10% = $41k.

[425] Intuitive Surgical, Inc. Form 10-K FY2020 at 67.

[426] $1.5 million / $41k = 37; $1.5 million / $20k = 75.

[427] See *supra* Section II.B.6.

[428] Intuitive Surgical, Inc. Form 10-K, FY2020, at 12.

equipment repair services to U.S. hospitals do not participate in international trade in such services.[429] Therefore, buyers can turn only to U.S. suppliers for EndoWrist repair and replacement. Accordingly, the market is no larger than the United States.

176. There are no regional submarkets within the United States. Like the da Vinci, EndoWrists are sold in all 50 states.[430] Within the U.S., Intuitive also had a one-price policy that meant buyers throughout the nation paid prices that closely followed nationwide list prices.[431] Further, the cost of domestic freight and packaging is only about 1% as large as product revenue,[432] thus indicating that any hypothetical monopolist in a regional submarket would not be able to profitably raise prices by 5% or more without triggering substitution to other regions within the United States.

177. Other evidence likewise supports the conclusion that the relevant geographic market is the United States. Different countries have different regulatory regimes that affect the relevant product market differently in different nations.[433] EndoWrist prices were also different in different regions of the globe.[434]

E. Intuitive Had Market Power and Monopoly Power in the Market for EndoWrist Repair and Replacement

178. Intuitive had monopoly power in the market for EndoWrist repair and replacement throughout the United States during the entire relevant time period, and thus necessarily also had market power during this period because monopoly power is a higher degree of market power. Three independently sufficient bases confirm Intuitive's monopoly power: (1) high market shares coupled with high barriers to entry and expansion; (2) direct evidence that Intuitive had the power to raise prices above competitive levels; and (3) direct evidence that Intuitive had the power to

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[429] IBISWorld, *Medical Equipment Repair & Maintenance Services,* December 2021, at p. 20 ("As a service industry, the Medical Equipment Repair and Maintenance Services Industry does not participate in international trade.").
[430] Intuitive Instrument & Accessory Transaction Data.
[431] *Supra* at Section II.D.2.ii.
[432] For 2017-2020, Intuitive earned $8,462.4 million in global sales of instruments and accessories (the smallest accounting category that Intuitive has provided which includes EndoWrists) versus "Freight & Packaging" costs of $108.0 million. Intuitive-00595405. Dividing 108.0 by 8462.4 comes to 1.3%.
[433] For example, regulatory differences between countries affected product rollouts, such as with Intuitive's extended use program (Intuitive Surgical Form, Inc. 10-K, FY 2020, at 7).
[434] *See*, e.g., Intuitive-00004608.

exclude rivals. I address each of these bases in the first three sections below. In a fourth section, I show that my conclusion that that Intuitive had monopoly power remains true even if the market were broadened to include the repair and replacement of wristed instruments on other MIST surgery robots or to include MIST surgery robots themselves.

1. High Market Shares Coupled with High Barriers to Entry and Expansion

179. As noted above, a high market share indicates that a firm has monopoly power when the market also exhibits high barriers to the entry of new rivals and the expansion of existing rivals. No rival firm has been able to make EndoWrists.[435] That leaves EndoWrist repair as the only possible source of competition in the market for EndoWrist repair and replacement. Intuitive's share of EndoWrist repair and replacement has remained at or near 100% for over twenty years. Until the first domestic sale by a rival in 2018,[436] Intuitive had a 100% U.S. market share. See Table 2 below. By 2022, Intuitive had driven all rival repair companies out of the U.S. market and again went back to having a complete 100% monopoly. Even during the intervening period between rival entry and their exclusion from the market, the market share of those rivals was limited to no more than 0.13% combined, and Intuitive's market share dominance remained durable and stable, ranging from 99.87% to 100%. See Table 2 below.

[435] *See, e.g.*, Intuitive-02069573-574 at 573 ("To date, there has been a monopoly on this product [EndoWrists] with no other source available other than Intuitive Surgical.").

[436] The first company to sell EndoWrist repair services to hospitals in the U.S. was Restore in July 2018, which was licensing technology developed by Rebotix. *See* Restore-00055937; May (in *Restore*) Dep. Ex. 8. SIS, acting as a distributor for Rebotix, first sold EndoWrist repair services in June 2019 (although it received a customer's EndoWrist that it evaluated to be beyond repair in November 2018). *See* SIS000167; Gibson (in *Rebotix*) Dep. at 157:24-25 ("Q Did Rebotix Repairs use SIS as a distributor? A Yes."). Rebotix itself first sold EndoWrist repair services directly to customers in March 2019. *See* REBOTIX175326; Papit (in *Rebotix*) 30(b)(6) Dep. at 84:25-85:4 ("The earliest dates of our repair was March 2019."). Restore also later developed its own method of repairing EndoWrists, but was excluded from the market by Intuitive's actions before it could make sales using its own method. *See* Parker (in *In re: da Vinci*) Dep. at 130:2-23.

Table 2: EndoWrist Repair and Replacement Revenue Shares 2017-2022[437]

Company	2017	2018	2019	2020	2021	2022
Intuitive	100%	>99.99%	99.87%	99.96%	>99.99%	100.0%
Rebotix	0%	0%	0.09%	0.02%	<0.01%	0%
Restore	0%	<0.01%	0.03%	0.02%	0%	0%
SIS	0%	0%	0.01%	0%	0%	0%

[437] Source: Intuitive Instrument & Accessory Transaction Data, REBOTIX175326, Restore-00055938, Restore-00055935, Restore-00055937, SIS000167, SIS000171. The figures for 2022 reflect testimony indicating that the rivals no longer sell EndoWrist repair. *See* Hamilton (in *In re: da Vinci*) Dep. at 33:12-22 ("Q. Okay. Is Rebotix today repairing EndoWrists? And I'm using the word 'repair' the way you've been using it today. A. Rebotix has the capability to repair them. I don't think there are -- there's any string coming through right now. But again, I -- I don't know that we would turn it away if it came in right now. I'm just not certain. I'm not involved in day-to-day operations. Again, I'm not even in that physical location right now. But if we are, it would be a very, very small amount."); Parker (in *In re: da Vinci*) Dep. at 130:2-20 (Restore hasn't reset use counters for hospitals since 2019 time-frame); Greg Posdal 30(b)(6) Dep. (Surgical Instrument), *Surgical Instrument Service Co. v. Intuitive Surgical, Inc.*, No. 3:21-cv-3496 (N.D. Cal.), at 22:13-17 ("Q. When's the last time SIS facilitated a chip reset for one of its customers? A. I couldn't be sure, but it was probably 2019 or '20, that that whole issue was shut down pretty quickly."); Keith Johnson 10/27/2022 30(b)(6) Dep. (Surgical Instrument), *Surgical Instrument Service Co. v. Intuitive Surgical, Inc.*, No. 3:21-cv-3496 (N.D. Cal.) at 42:12-20 ("Q What is Restore's repair program? A Restore has the capability to extend the lives of EndoWrists on Si [compatible] EndoWrists. Q Does SIS play any role in offering that [EndoWrist] repair program to customers? A Based on the practices, like we spoke about before, of Intuitive Surgical, we are no longer providing or offering the Si [compatible EndoWrist] repair program in the United States."); Parker (in *Restore*) 30(b)(6) Dep. at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots."); Papit (in *Rebotix*) 30(b)(6) Dep. 33:3-16 (Rebotix "is basically not functional at this moment").

While a hospital could, in theory, purchase partially used EndoWrists from other hospitals via a gray market, apparently this gray market also ran afoul of Intuitive's contractual restraints. *See, e.g.*, Madewell (in *Restore*) Dep. at 119:8-12 ("Only the hospital or facility that buys that instrument can use that instrument. You are not allowed to buy instruments from another hospital because we're [Intuitive] not going to support them at your facility."). Consistent with this, I have seen no evidence that hospitals were able to circumvent Intuitive's contractual restrictions by purchasing significant volumes of EndoWrists through a gray market. Moreover, gray market sales would simply transfer ownership of one Intuitive-supplied EndoWrist from one user to another. Such an ownership transfer would not change that EndoWrist's use limit or the total number of EndoWrist uses being supplied by Intuitive relative to other firms, and thus such gray market transfers would have no effect on market shares.

180. There are numerous and significant barriers to entry and expansion in the market for EndoWrist repair and replacement. There are two methods for entering this market – developing a replacement instrument and developing a method of repair – and both have entry barriers.

181. There are significant barriers to developing an alternative (not-repaired) replacement for EndoWrists. To begin with, a new medical device that was an alternative to replace EndoWrists would, like the EndoWrist itself, be a Class II medical device requiring FDA approval.[438] Perhaps the largest hurdle is that EndoWrists are exclusively used on the da Vinci and developing an alternative instrument would require technical information available only from Intuitive.[439] The enormity of the entry barriers is confirmed by the reality that no firm has been able to enter by making an EndoWrist replacement.

182. There are also significant barriers to developing a method of EndoWrist repair, which includes a circumvention, extension, or reset of the use counter. The use counter is a technological restraint on rival repair competition which reinforced the contractual restraints by creating a barrier to entry.

183. In addition to these above-mentioned barriers to entry and expansion, Intuitive's exclusionary agreements have exacerbated those barriers by deterring entry and, for the few that entered, preventing their expansion and ultimately driving them out of the market.[440] Among other things, those exclusionary agreements prohibited not only the use of EndoWrists not made or approved by Intuitive, but also the repair of EndoWrists by any third party.[441]

184. Evidence of these significant barriers to entry can be seen by looking at Rebotix's and Restore's efforts to develop repair methods. "Rebotix has spent approximately $5 million in total research and development to commercialize its service of EndoWrist repairs," and that investment enabled it to bring only S/Si-compatible EndoWrist repair to market.[442] Restore at first licensed that technology

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[438] Intuitive Surgical Form, Inc. 10-K, FY2020, at 12.

[439] DeSantis (in *Rebotix*) 30(b)(6) Dep. 69:8-14 ("Q […] Another challenge might be that the da Vinci robot only works with Intuitive manufactured instruments; right? A Other than the instruments in question in this case [repaired EndoWrists], yes.").

[440] *See* earlier in this section and *infra* at Sections IV.C and IV.E.

[441] *Id.*

[442] Decl. of Glenn Papit, at ¶¶ 4-5, *Rebotix Repair LLC vs. Intuitive Surgical, Inc.*, No. 8:20-cv-02274 (M.D. Fla. 1/5/2022), ECF No. 147, Ex. P16. Rebotix has also succeeded in resetting the

from Rebotix and then spent $150,000-200,000 to develop its own repair method.[443] In 2022, Restore was trying to raise over $3 million to continue development on Xi-compatible EndoWrist repairs,[444] and Restore has taken steps to prepare to be able to repair X and Xi instruments.[445] Further, the exclusionary restraints imposed by Intuitive created large barriers to rival repair entry and expansion, as detailed below in Section IV.

185. The high degree of barriers to rival repair entry and expansion is confirmed by the fact that only two firms (Rebotix and Restore) were ever able to develop the technology to fully repair an EndoWrist. Neither of them was ever able to gain more than a fraction of a percent of market share, and they all ultimately were driven out of the market. In short, the existence of high barriers to entry is confirmed by the evidence that actual entry in this market has been rare and unsuccessful, and the existence of high barriers to expansion is confirmed by the fact that the few firms that did enter were unable to expand in any significant way before being driven out of the market.

2. Direct Evidence of Power over Price

186. Direct evidence of Intuitive's power over pricing for EndoWrist repair and replacement also confirms Intuitive's monopoly power. The ability to increase prices above the competitive level is a hallmark of monopoly power. This means that evidence that Intuitive can raise its prices above competitive levels shows Intuitive has monopoly power.

187. One source of evidence on the ability to raise price above the competitive level is to look at competitive yardsticks or benchmarks. In this case, several are available (and discussed at greater length in Section VI.B below). As a starting point, Intuitive contemplated that in response to potential competitive pressure, it might have had to offer its own repaired EndoWrists at discounts of 25%, 30%, or 40%.[446] Ultimately, Intuitive was able to exclude rivals using the challenged restraints and did not feel the need to offer these discounts, but the plan to offer such discounts if the market became competitive indicates that Intuitive was exercising a

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use counter on X/Xi-compatible EndoWrists but has not finished all aspects of the repair process needed to bring it to market. *Infra* Section IV.A.

[443] Parker (in *Restore*) Dep. at 204:16-206:2.

[444] Intuitive-00094918; Restore-00094938-956 at 953-955. *See also*, Declaration of Clif Parker, 12/10/2021, in *Restore v. Intuitive,* Case No. 5:19-cv-55-TKW-MJF ("Parker Declaration").

[445] Parker (in *Restore*) Dep. at 132:7 – 142:12.

[446] DeSantis (in *Rebotix*) Dep. Ex. 38 at Intuitive-00273287.

power to price at well above the competitive level. As another point of comparison, Intuitive's EndoWrist prices have been significantly higher than that of rival MIST surgery robot instruments on a per-use basis.[447] In addition, Intuitive's EndoWrist prices have been significantly higher than the functionally equivalent repaired EndoWrists offered by third-party IRCs.[448] Each of these methods provides direct evidence that Intuitive exercised a significant power to raise prices above competitive levels.

188. As noted above, another economic method to assess market power is to use the Lerner Index, for which the best available indicator is Intuitive's internal calculation of its "contribution margin" percentage of sales.[449] Intuitive calculated that its contribution margin percentage was .72-.75 for Instruments and Accessories (I&A).[450] Although this Intuitive calculation does not break out EndoWrists from other instruments and accessories, EndoWrists are a type of instrument and instruments "generally are higher" margin than accessories.[451] Thus, .72-.75 seems a conservative measure of the contribution margin percentage for EndoWrists. Those indicators of the EndoWrist Lerner Index are far in excess of not only the value of around 0.1 that prevails in highly competitive markets, but also higher than the value of 0.4 to 0.5 that could prevail in reasonably competitive markets.[452] In short, Intuitive's high contribution margins indicate that Intuitive was able to maintain prices for EndoWrists that were well above even "reasonably" competitive levels. Indeed, they indicate that Intuitive was able to charge prices that were 80-100% above the top of the normal range for a "reasonably" competitive Lerner Index

[447] *Infra* at Section VI.B.2.
[448] *Infra* at Section VI.B.3.
[449] *See supra* Section II.C.2.
[450] *See* Intuitive-00595405.
[451] M. Mohr (in *In re: da Vinci*) Dep. at 42:5-11 ("Q. (BY MR. SNYDER) If we divided the information into two parts, instruments on the one hand and accessories on the other, in the aggregate, would one have a higher margin than the other? […] THE WITNESS: Instruments generally are higher than accessories."); Intuitive Surgical Form 10-K FY2021 at 7 ("We manufacture a variety of instruments, most of which incorporate EndoWrist technology").
[452] AMERICAN BAR ASSOCIATION, ECONOMETRICS 247 (2d ed. 2014) ("In a perfectly competitive market, price is driven to marginal cost, making the Lerner Index equal to zero. On the other hand, as firms gain market power, they are able to sustain price above marginal cost, leading to a higher Lerner index. In highly competitive industries, the Lerner index may be around 0.1, whereas in industries that are 'reasonably' competitive, the Lerner Index may be 0.4 or 0.5, but there is no defined rule for identifying market power.").

level.[453] This is well above the typical 5% threshold for a SSNIP test and a strong indicator of power over price.

189. As also discussed above, another source of evidence used by economists to evaluate market power is a firm's own-price elasticity of demand. Given the indicated Lerner Index of 0.72-0.75, the own-price demand elasticity for the da Vinci is 1.33-1.39.[454] It is never profit maximizing for a firm to price a level where its own-price demand elasticity is less than 1.[455] Accordingly, the economic literature recognizes: "the [demand] elasticity cannot be less than 1, so an estimated [demand] elasticity of less than 2 must be considered rather low."[456] Such a low own-price demand elasticity indicates that there was not close competition between the EndoWrist and any other alternatives because the own-price elasticity is a function of the cross-price elasticities of demand.[457]

3. Direct Evidence of Power to Exclude

190. Evidence that a firm has been able to successfully exclude rivals directly shows that the firm has market power because only firms with market power can profitably exclude rivals. Here, the direct evidence detailed below in Section IV shows that Intuitive was able to exercise a power to entirely exclude competition from the market for EndoWrist repair and replacement, thus indicating monopoly power. Intuitive's customers recognized that this exclusion gave Intuitive monopoly power over repair and replacement that Intuitive used to charge higher prices.[458]

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[453] A Lerner Index of 0.72-0.75 indicates price is 3.6-4 times cost. The Lerner Index of 0.5 (the top of the normal range for a "reasonably" competitive level) indicates that price equals 2 times cost. Thus, Intuitive's high contribution margins of 0.72-0.75 indicate that Intuitive charged prices that were 80-100% above the top of the normal range for a "reasonably" competitive level.

[454] This is because a profit-maximizing firms raises prices until its Lerner Index equals one divided by its own-price elasticity. *See, e.g.,* CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005). Thus, the own-price elasticity equals one divided by its Lerner Index, which here is 1/.75 to 1/.72 = 1.33-1.39.

[455] CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 94 (4th ed. 2005).

[456] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66(2), pp. 363-414 at 381. *See also*, CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005), Table 4.1 (at p. 98).

[457] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66, pp. 363-414 at 413.

[458] Intuitive-00246469-491 at 489 ("… a frustration felt due to the monopoly position that da Vinci has, which requires hospitals to buy equipment and maintenance for their da Vinci systems directly, with no competition that might improve pricing or generate innovation.").

4. My Conclusions on Monopoly Power Would Not Change If the Relevant Market Were Broadened to Include the Repair and Replacement of Wristed Instruments on Other MIST Surgery Robots or to Include MIST Surgery Robots Themselves

191. My conclusions about Intuitive's monopoly power would not change if the relevant market were broadened to include not only the repair and replacement or EndoWrist instruments used with the da Vinci, but also the repair and replacement of wristed instruments used with other MIST surgery robots as well. Because the da Vinci had over a 99.5-99.6% share of installed base of U.S. MIST surgery robots,[459] Intuitive would necessarily have a similar overwhelming monopoly market share of wristed instruments used, indeed even higher because rivals had more limited offerings of wristed instruments.[460] Intuitive's revenue market share would be even higher since the per-use price for EndoWrists was higher than for rival instruments.[461] The barriers to entry and expansion would remain enormous, as is confirmed by the lack of successful entry and expansion by rivals. Intuitive's high prices and profit margins would continue to provide direct evidence of a monopoly power over price. And Intuitive's exclusion of all rival repair and replacement would continue to provide direct evidence of a monopoly power to exclude.

192. The conclusion that Intuitive's monopoly power over the da Vinci gave it a power to charge monopoly prices for instruments was acknowledged within the medical field. For example, a 2013 article noted that Intuitive "profits not only from initial sales of the da Vinci robot but also from subsequent recurring sales of instruments," and that "Intuitive Surgical can command high premiums seemingly because of its monopoly position as the sole supplier of soft tissue robotic surgical equipment: the da Vinci robot is the only system of its kind on the market."[462]

193. Even if the da Vinci robot, EndoWrists, and replacement EndoWrists were all to be considered a single "product," *EndoWrist repairs still would be a pricing constraint* on that single product. (This is also true even if da Vinci service is included in the "single product.") Repairs constrain the pricing of EndoWrists (as shown in Section II.D.2). This is true regardless of whether they are a separate product market, and necessarily means that repairs constrain the combined pricing of EndoWrists and da Vinci robots. Thus, repairs would be part of that single market (as a partial substitute) and the exclusion of such repairs would need to be evaluated

[459] *See supra* Table 1.
[460] *See supra* ¶ 132.
[461] *Infra* at VI.B.2.
[462] Abhishek Trehan and Tristan J. Dunn, *The robotic surgery monopoly is a poor deal*, 347 BMJ, 1 (2013).

for anticompetitive effects in that single product market (albeit as potential exclusive dealing, not as tying).

194. The fact that my conclusions do not change if EndoWrists and the da Vinci are collectively considered as one product has to do with the fact that Intuitive has had monopoly power in both markets and has exploited that monopoly power in both markets. This is not a situation where competition in the foremarket is constraining Intuitive from causing antitrust injury in the aftermarket. Nor does the situation here involve a classic razor-and-razor-blades business model where the foremarket product is sold at low (or zero) prices while the aftermarket product is sold at profitable prices. As described above, Intuitive earns high margins on both the foremarket sale of the da Vinci and the aftermarket sales of EndoWrists.

F. The US Market for Servicing da Vinci Robots Is a Relevant Market

195. There is a relevant market for servicing da Vinci robots in the United States. The servicing of da Vinci robots includes both repairs and routine maintenance and this service is necessary for continued use of the robot.[463]

1. Servicing da Vinci Robots Is an Aftermarket Separate from Sales of da Vinci Robots

196. As I noted in Section II.A above, defining a relevant product market is an important step toward the goal of assessing the allegations of harm. Here, the allegations include a "requirements tie," because Plaintiffs allege that Intuitive is requiring buyers and lessees of da Vinci robots to purchase *all* robot servicing from Intuitive, with no other sources of maintenance or repairs permitted.[464] Thus, one must evaluate whether the allegedly tied service or product is *separate* from the allegedly tying product, at least for economic tying analysis.

197. As a starting point, Intuitive and third-party analysts treat da Vinci robots and service as separate products. As noted above, Intuitive uses the term "system" to refer to collection of equipment that constitutes the da Vinci robot.[465]

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[463] See description in Section I.B.3.i above.

[464] See, e.g., CAC ¶¶ 59, 72-75, 174-179, 181-182. I also explain below in Section III that the economic evidence shows Intuitive's restraints against third-party servicing *do in fact* function as requirements ties (i.e., the plaintiff's allegations correctly reflect the economic nature of the challenged conduct).

[465] *See supra* at Section I.B.1.i.

Intuitive lists "Service" separately from "Product" in its financial reports and "Service" separately from "Systems" on its website.[466] Stacey Donovan, executive director of surgical services at EvergreenHealth hospital, had the understanding "that the da Vinci system and the service plan are separate products available for purchase."[467] Intuitive also records da Vinci robot and service transactions separately.[468] Third-party analyst Informa Pharma Intelligence treat robots and services as separate revenue segments.[469]

198. In antitrust economics, whether two products are "separate" for the purposes of analyzing a tie depends on the economic facts that are relevant to whether such a tie can impose anticompetitive effects. The economic literature (including the treatise on tying that I co-authored) has identified a set of tests that can be used to determine whether two products should be considered "separate" for the purposes of tying analysis.[470]

199. Here, the economic evidence indicates that da Vinci service is "separate" from da Vinci robot sales (for the purposes of analyzing Intuitive's alleged tie) because: (i) it would be feasible to sell the products separately; (ii) many hospitals find it desirable to obtain the products separately; and (iii) the challenged tie is *not* commonplace in other markets.

i. It Has Been Feasible to Sell MIST Surgery Robots Separately from Their Servicing

200. Two products are not "separate" for the purpose of analyzing a requirements tie if it would not be *feasible* for sellers of the tying product to sell it

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[466] *See*, e.g., Intuitive Surgical, Inc. Form 10-K, FY2006 at 6, 8 ("Our principal products include the da Vinci Surgical System and a variety of multiple-use EndoWrist instruments and accessories" with "service contracts and select time and material programs" listed separately from either systems or instruments and accessories); *Da Vinci by Intuitive*, Intuitive Surgical, https://www.intuitive.com/en-us/products-and-services/da-vinci (accessed 11/8/2022) (separate categories for systems, instruments, and services).

[467] Donovan (in *Rebotix*) Dep. at 9:3-14, 81:24-82:4 ("Q. Is it your understanding that the da Vinci system and the service plan are separate products available for purchase? (. . .) THE WITNESS: Yes, that's correct. That's my understanding.").

[468] Intuitive Robot Transaction Data; Intuitive Service Contract Data.

[469] *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in "Soft Surgery Robotics,"* Informa Pharma Intelligence, April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022), at 4.

[470] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1744-50 (1996).

separated from the tied product.[471] Here, selling the products separately would involve Intuitive selling da Vinci robots without restraints on using third parties to service da Vinci robots.[472] Because the tie is imposed contractually and through Intuitive actions taken after-the-fact of a da Vinci sale, there is no physical or practical sense in which the allegedly tied product (da Vinci service) cannot be separated from the tying product (da Vinci robot). Intuitive merely needs to not implement its tying restraints, which is entirely feasible. Indeed, the feasibility of not tying da Vinci robots to da Vinci servicing is confirmed by the fact that Intuitive does not tie them together in at least some foreign markets[473] and has also trained some hospitals to provide some of their own da Vinci servicing.[474]

201. Buyers can be and have been charged separately for the da Vinci robot and da Vinci service.[475] Stacey Donovan, executive director of surgical services at EvergreenHealth, testified that "the da Vinci system and the service plan are separate products available for purchase."[476]

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[471] *Id*. at ¶ 1743b ("Threshold proof of seller ability to unbundle should also be required. If unbundling is not physically or economically feasible, there is no point in ordering firms to unbundle.").

[472] *See infra* Section III.

[473] See M. Mohr (in *In re: da Vinci*) 30(b)(6) Dep. at 29:7-11 ("Q. […] Let's start with da Vinci systems, are they repaired by third parties in any foreign markets, Mr. Mohr? A. Yes."); Morales 11/9/2022 30(b)(1) Dep. (Intuitive), *In re da Vinci Surgical Robot Antitrust Litigation*, No. 3:21-cv-3825 (N.D. Cal.), at 45:23-46:14 ("We have trained -- well, Intuitive had distributors that were authorized and trained to perform service on the -- on the Intuitive products, and so we had -- I don't know what the exact number was, but we probably had 30 plus distributors around the world that were non- Intuitive that were trained to work on our product. Q Okay. These distributors, were any of them located in the United States? . . . THE WITNESS: No, they were not.")

[474] Morales (in *In re: da Vinci*) 30(b)(1) Dep. at 46:16-47:10 ("Q Okay. And the technical training that you mentioned that Intuitive provided to some hospitals, can you expand on what that training was? [...] THE WITNESS: Depends on the tie period. Back in, you know, the early 2000s, we did training programs very similar to the – the training programs that we did for our field engineers, and there were a couple hospitals that – that did those programs. And then – and then we did onsite, meaning on premise training, for biomedical teams that enabled them to do first look and first response to technical problems. BY MS. ETHERIDGE: Q What is a 'first response'? What do you mean when you use that terminology? A Meaning that the hospital staff, rather than call Intuitive as their first call, they would call their biomedical engineer or the person that we had trained onsite to try to resolve the problem first.").

[475] Intuitive Robot Transaction Data; Intuitive Service Contract Data.

[476] Donovan (in *Rebotix*) Dep. at 9:3-14, 81:24-82:4 ("Q. Is it your understanding that the da Vinci system and the service plan are separate products available for purchase? (. . .) THE WITNESS: Yes, that's correct. That's my understanding.").

202. Not only has da Vinci servicing been priced separately from da Vinci robots, but also da Vinci servicing prices can and have changed over time.[477] The prices that customers have paid for da Vinci servicing have thus not been necessarily fixed for the life of any individual da Vinci. This is significant because a da Vinci is a durable good capable of being used for seven years.[478]

ii. Many Hospitals Have Desired to Obtain da Vinci Servicing from Sources Other Than Intuitive

203. Two products are not economically "separate" for the purpose of analyzing a tie if there is no buyer demand to purchase them separately.[479] As described in this section, there is demand from hospitals who wish to purchase da Vinci servicing separately from the da Vinci robot.

204. In spite of Intuitive's prohibitions on doing so, many hospitals had or would have opted to purchase da Vinci servicing from third party IRCs instead of buying it from Intuitive. Restore entered the market in 2019 doing work such as replacing batteries, repairing robot arms, and preventative maintenance.[480] Restore's entry into the market found success, initially being contracted for services that would have been worth hundreds of thousands of dollars in annual revenue.[481] Clif Parker of Restore testified that, "The majority of the hospitals that we spoke to were very positive about us doing repairs [to the da Vinci robot], they wanted an alternative, they wanted a second look, somebody that could say, yes, that – that is the problem, they wanted another pricing alternative, they wanted another entity that could provide service potentially quicker, and less arrogant, and these were the things that – that we heard is they wanted a company like Restore to be in business to keep the

[477] For example, the range of annual service contract prices offered by Intuitive changed from $80,000 - $170,000 in 2017 (Intuitive Surgical Form, Inc. 10-K FY2017) to $80,000 - $190,000 in 2018 (Intuitive Surgical Form 10-K FY2018).

[478] GENERAL SURGERY NEWS, *In the News*, May 22,2015, https://www.generalsurgerynews.com/In-the-News/Article/05-15/Doing-the-Math-Can-the-Robot-Be-Cost-Effective-for-General-Surgery-/32395 (accessed 11/20/2022) ("The lifetime of a da Vinci robot is a maximum of seven years.").

[479] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1743a (1996) ("If no buyers want the unbundled items, then [more detailed inquiry] is pointless. Nothing useful could be accomplished by condemning the bundle, because no unbundled items would be purchased. Nor would anything useful be accomplished if the number of buyers interested in buying unbundled comprise an insignificant share of the tied market.").

[480] Restore-0055937.

[481] Restore-00055937 (rows 25-39 with $615,000 worth of annual servicing with Baylor Scott & White Hospital).

industry running smoothly and give them options."[482] Hospitals wanted Restore to perform services such as replacing batteries, fixing arms, and other troubleshooting.[483]

205. Intuitive's warnings and threats that forced hospitals to stop using Restore's services are further evidence of the demand for such third-party servicing of da Vinci robots. It stands to reason that if there had been no demand for purchasing the service from a rival, there would have been no reason for such correspondence. However, Intuitive did send warning letters to customers regarding actual or suspected use of third-party servicing of da Vinci robots. For example, Intuitive sent a letter dated January 17, 2020 to Ardent Health Services warning Ardent that, among other things, "Intuitive does not have an obligation to provide Services…on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive," i.e., third party IRCs.[484]

iii. It Has Been Common for Firms Not to Impose This Type of Tie

206. When separating products is feasible and desired by some buyers, that many firms in similar markets sell them separately indicates that the tying and tied products are "separate," and would so indicate even if some other firms did bundle them together.[485] If it is common for firms to sell two products separately in similar markets, *either competitive or not*, that indicates that it is efficient for firms to sell them separately, which thus indicates separate products.[486]

207. Here, the evidence indicates that Intuitive itself has not tied da Vinci robots to da Vinci servicing in at least some foreign markets.[487] Such evidence strongly indicates that efficiencies did not drive Intuitive's tying of da Vinci robots

[482] Parker (in *In re: da Vinci*) Dep. at 162:16-25.
[483] *Supra* Section I.B.3.i. *See also* Posdal 30(b)(6) Dep. (in *Surgical Instrument*) at 81:5-19 (hospitals also expressed interest in having SIS perform da Vinci servicing).
[484] Wasfy (in *Restore*) Dep. Ex. 17 at AHS-MGMT-INTUITIVE_0000242. *See also*, Wasfy (in *Restore*) Dep. Ex. 23 at AHS_MGMT000007-8.
[485] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744e (1996) (suppose "many sellers in the competitive analogue sell the items unbundled but many others sell them bundled only … the market test indicates separate products on balance.").
[486] See detailed discussion of this in Section II.D.1.iii above.
[487] See Mohr (in *In re: da Vinci*) 30(b)(6) Dep. at 29:8-11 ("Q. …Let's start with da Vinci systems, are they repaired by third parties in any foreign markets, Mr. Mohr? A. Yes.").

to servicing in the U.S. market and thus supports a conclusion that they are separate products.

208. Senhance service has been at least partly unbundled from its MIST surgery robot. TransEnterix describes a role for third party servicing of the Senhance akin to what Restore had been attempting to provide for the da Vinci:

> "The Partner Service Plan has a strategic intent to utilize local hospital resources and/or Distribution Partners as the direct service provider allowing reduced service costs for the customer and for TransEnterix. This plan enables an onsite, trained individual to respond in the Operating Room within minutes, supported by TransEnterix technical support line and remote diagnostic support with the possibility to rollover unused service dollars towards future purchases. While providing a customer focused partnership approach, the Partner Service Plan will provide an economical approach for both the customer and TransEnterix."[488]

In addition, TransEnterix indicated that it would "Lease TransEnterix diagnostics software and specialty tooling to perform maintenance activities."[489]

209. Looking at medical devices in general, the frequent absence of this type of bundling can be demonstrated by the well-established existence and size of independent service organizations ("ISOs"). A 2018 FDA report "conclude[d] that the estimated total number of firms performing medical device servicing in the U.S. is between 16,520 and 20,830."[490] It is estimated that approximately a quarter of the revenue for medical equipment repair and maintenance in the U.S. is earned by third party (non-OEM) companies.[491] The prevalence of these types of firms shows that, as a general matter, medical device manufacturers are not universally tying the sale of their devices to the servicing of those devices.

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[488] TRE001216-218 at 217. See also, TRE001204-207 at 206 (Senhance brochure offering as an option the "Partnership Service Plan" which "is a joint service approach utilizing local hospital resources" and includes "[s]oftware diagnostic tool kit provided").

[489] *Id.* at 218. *See also*, TRE001208-1215 at 213 ("The Partner Service Plans strategic intent is to utilize local hospital resources as the direct service provider allowing reduced service costs for the customer…").

[490] U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/media/113431/download (accessed 7/29/2022).

[491] IBISWorld, *Medical Equipment Repair & Maintenance Services*, Industry Report OD4964, December 2021, at 18.

2. Servicing da Vinci Robots Is an Aftermarket Separate from Sales of EndoWrist Repair and Replacement

210. As I noted in Section II.A above, defining a relevant product market is an important step toward the goal of assessing the allegations of harm. Here, there are allegations that Intuitive has "dominant economic power" in several markets including "the domestic da Vinci service aftermarket[] and the domestic EndoWrist [r]epair and [r]eplacement [a]ftermarket."[492] In this section, I evaluate whether the market for da Vinci service is *separate* from the market for EndoWrist repair and replacement.

211. To begin with, Intuitive and third-party analysis treat EndoWrist replacement and da Vinci service as separate products. Intuitive's sales contracts explicitly define da Vinci servicing to include the replacement of robot parts but *not* to include the replacement of EndoWrist instruments.[493] Intuitive lists "Service" separately from "Instruments and Accessories" in its financial reports and on its website.[494] Intuitive also records EndoWrist replacement and service transactions separately.[495] Third-party analyst Informa Pharma Intelligence treat instruments and services as separate revenue segments.[496]

212. In antitrust economics, whether two products are "separate" for the purposes of analyzing a tie depends on the economic facts that are relevant to whether the tie can anticompetitively harm consumers. The economic literature (including the treatise on tying that I co-authored) has identified a set of tests that

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[492] *See, e.g.*, CAC ¶¶ 181, 193.

[493] *See, e.g.*, Intuitive-01846020-034 at 021 (§5.1(B) "Services Included…. Replace defective or malfunctioning System parts (excludes Instruments and Accessories…)"). The same language occurs in other agreements, such as Intuitive-00005135-147 at 136, Intuitive-00204014-025 at 015, Intuitive-01989020-038 at 027.

[494] *See*, e.g., Intuitive Surgical, Inc. Form 10-K, FY2020, at 5-7. *Da Vinci by Intuitive*, Intuitive Surgical, https://www.intuitive.com/en-us/products-and-services/da-vinci (accessed 7/25/2022) (listing systems, software, instruments, stapling, energy, vision, education and training, and support and analytics)

[495] Intuitive Instrument & Accessory Transaction Data (Intuitive-00595406 – Intuitive-00595437, Intuitive-00695231 – Intuitive-00695234, Intuitive-00706090, Intuitive-00701322); Intuitive Service Contract Data (Intuitive-00695236, Intuitive-00706089, Intuitive-00000316); Intuitive Robot Transaction Data (Intuitive-00595429 – Intuitive-00595463, Intuitive-00849019).

[496] Informa Pharma Intelligence, *Market Intel: Medtech Giants Ready to Battle Frontrunner Intuitive Surgical in "Soft Surgery Robotics,"* April 2020, https://pharmaintelligence.informa.com/~/media/informa-shop-window/pharma/2020/files/article-packs/mti-market-intel-report.pdf (accessed 8/30/2022), at 4.

can be used to determine whether two products should be considered "separate" for the purposes of tying analysis.[497]

213. Here, the economic evidence indicates that da Vinci service is "separate" from EndoWrist repair and replacement (for the purposes of analyzing Intuitive's alleged tie) because: (i) it would be and was feasible to sell the products separately; (ii) many hospitals would have found it desirable to obtain the products separately; and (iii) the challenged tie is *not* commonplace in other markets.

i. It Is Feasible to Sell da Vinci Service Separately from EndoWrist Repair and Replacement

214. Two products are not "separate" for the purpose of analyzing a requirements tie if it would not be *feasible* for sellers of the tying product to sell it separated from the tied product.[498] Here, selling the products separately would mean not tying EndoWrist repair and replacement to the sale of da Vinci servicing.[499] Because the tie is imposed contractually and through Intuitive actions taken separately from provision of da Vinci service, there is no physical or practical sense in which the products cannot be separated. Intuitive merely needs to not implement its tying restraints, which is entirely feasible.

215. Buyers can and have been charged separately for the EndoWrist replacements and da Vinci service. Intuitive had recorded these charges separately.[500] This reflects the reality that customers either purchase a service contract up front or pay time-and-materials as issues arise, while buying EndoWrists as needed for surgeries. Furthermore, Intuitive has priced da Vinci service separately from EndoWrist replacements.

[497] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1744-50 (1996).
[498] *Id*., at ¶ 1743b ("Threshold proof of seller ability to unbundle should also be required. If unbundling is not physically or economically feasible, there is no point in ordering firms to unbundle.").
[499] *See infra* Section III.
[500] Intuitive Robot Transaction Data; Intuitive Service Contract Data.

ii. Many Hospitals Desire to Obtain da Vinci Servicing Separately from EndoWrist Repair and Replacement

216. Two products are not economically "separate" for the purpose of analyzing a tie if there is no buyer demand to purchase them separately.[501] As described in this section, there is demand from hospitals who wish to purchase da Vinci servicing separately from the EndoWrist repair and replacement.

217. In spite of Intuitive's prohibitions on doing so, hospitals have opted to purchase da Vinci servicing from a different source than EndoWrist repair and replacement. Numerous customers purchased EndoWrist repair from an IRC while purchasing da Vinci service from Intuitive.[502] As another example, Restore signed a service contract with Baylor Scott & White Health which would have been worth hundreds of thousands in annual revenue,[503] and this contract did not require all EndoWrist repair and replacement to be purchased from Restore.[504]

iii. It Has Been Common for Firms Not to Impose This Type of Tie

218. When separating products is feasible and desired by some buyers, that many firms in similar markets sell them separately indicates that the tying and tied products are "separate," and would so indicate even if some other firms did use it.[505] If it is common for firms to sell two products separately in similar markets, *either competitive or not*, that strongly indicates that it is efficient for firms to sell them separately, which thus indicates separate products.[506]

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[501] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1743a (1996) ("If no buyers want the unbundled items, then [more detailed inquiry] is pointless. Nothing useful could be accomplished by condemning the bundle, because no unbundled items would in fact be purchased. Nor would anything useful be accomplished if the number of buyers interested in buying unbundled comprise an insignificant share of the tied market.").

[502] For example, Baptist Health Medical Center; New Hanover Regional Medical Center; Jackson-Madison County Hospital; FirstHealth Moore Regional Hospital. Intuitive Service Contract Data; REBOTIX175326. Intuitive was the monopoly provider of da Vinci service, so by definition the hospitals purchasing repaired EndoWrists would have had to purchase da Vinci service from Intuitive.

[503] Restore-00055937.

[504] Restore-00004061-075.

[505] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744e (1996) (suppose "many sellers in the competitive analogue sell the items unbundled but many others sell them bundled only … the market test indicates separate products on balance.").

[506] See detailed discussion of this in Section II.D.1.iii above.

219. TransEnterix has allowed buyers to get servicing and instruments from third parties.[507] In at least some foreign markets, Intuitive has allowed for third party da Vinci servicing,[508] which implies that servicing was unbundled from Intuitive's instrument sales. Furthermore, Rebotix and SIS have not offered da Vinci servicing and so by definition did not tie EndoWrist repair and replacement to da Vinci servicing.

220. Looking at medical devices in general, the frequent absence of this type of tie can be demonstrated by the well-established existence and size of independent service organizations ("ISOs"). A 2018 FDA report "conclude[d] that the estimated total number of firms performing medical device servicing in the U.S. is between 16,520 and 20,830."[509] The prevalence of these types of firms shows that, as a general matter, medical device manufacturers are not universally tying the sale of their devices to the servicing of those devices.

3. The Servicing of da Vinci Robots Has Had No Economic Substitutes

221. The servicing of da Vinci robots has had no economic substitutes. Without such servicing, da Vinci robots could become inoperable, and the only alternatives would be buying a new da Vinci robot (which would cost around $1.5 million) or a rival MIST surgery robot (which would also be very expensive, while having lower functionality).[510] Nor could hospitals have serviced their own da Vincis because that would require specialized training and knowledge and because such self-servicing was prohibited by their contracts with Intuitive.[511] Moreover, as discussed below in Section V, Intuitive's ties also prohibited buyers from trying to

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[507] *Supra* Sections II.D.1.iii and II.F.1.iii.

[508] *Supra* Section II.F.1.i.

[509] U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/media/113431/download (accessed 7/29/2022).

[510] *See supra* Sections II.C.1.ii and ¶ 132; Intuitive Surgical Form 10-K, FY2021, at p. 70 ("The da Vinci Surgical System ASP, excluding the impact of systems placed under operating lease or usage-based arrangements and Ion systems, was approximately $1.55 million for the year ended December 31, 2021, compared to approximately $1.50 million for the year ended December 31, 2020."); TransEnterix, Inc. Form 10-K FY2019 at 38 ("Company also recognized $1.3 million…related to a 2017 system sale for which revenue was deferred until the first clinical use."); Intuitive-00226706-717 at 709 ("Medrobotics Flex System" "System Cost $950K - $500K (have sold for less)").

[511] Answer to Complaint ¶ 68 ("Intuitive admits that servicing da Vincis requires specialized training and knowledge."); *infra* Section III.

get da Vinci servicing from firms that serviced other MIST surgery robots or medical equipment.

4. Services Contained Within the Relevant Market

222. I define both a larger market for all da Vinci robot servicing as well as two sub-markets for contestable versus incontestable da Vinci robot servicing. In both the market and the two submarkets, I group a variety of different services, such as replacing batteries or repairing robot arms. Even though those services are not substitutes for each other, it is reasonable to group them for various reasons. First, a firm that supplies one service can supply the other services, which antitrust guidelines indicate is a reason to group them.[512] Second, when Intuitive charged an hourly rate for da Vinci servicing, it was the same rate regardless of the type of service.[513] Thus, market conditions that affected the pricing of some da Vinci servicing would also affect the pricing of other da Vinci servicing. Third, whether one defined a single da Vinci servicing market or hundreds of markets for each particular type of da Vinci servicing would not alter the competitive conclusions, because Intuitive would have a 100% or near-100% market share and foreclosure share in each relevant market. Given that "the purpose of defining the market and measuring market shares is to illuminate the evaluation of competitive effects,"[514] it thus makes sense to group all the services provided in this market and submarkets.

223. I specify separate sub-markets for contestable versus incontestable da Vinci robot servicing because although rivals could offer many forms of da Vinci servicing without the challenged contractual restraints, including both preventative maintenance and repairs,[515] da Vinci had proprietary tools that would prevent rivals from competing for other forms da Vinci servicing even without the challenged

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[512] DOJ/FTC, Horizontal Merger Guidelines (2010) at fn. 8 ("If this type of supply side substitution is nearly universal among the firms selling one or more of a group of products, the Agencies may use an aggregate description of markets for those products as a matter of convenience.").

[513] Intuitive-00154125.

[514] DOJ/FTC, Horizontal Merger Guidelines §4.1.1 (2010).

[515] The only rival to Intuitive in this market was understood to be able to perform a variety of services. *See*, e.g., Wasfy (in *Restore*) Dep. Ex. 18 at Intuitive-0000308-309 (Cairo Wasfy of Ardent Health Systems understood Restore to be able to perform "major repairs" and Sandy Morford of Renovo [a medical equipment service and management company] indicated that Restore can "do about 90% of a da Vinci S or Si PM [Preventative Maintenance]."); Renovo Solutions, *Who We Are*, https://renovo1.com/who-we-are/who-we-are/ (accessed 11/16/2022). *See also supra* Section I.B.3.i (noting that Restore had the ability to do period maintenance, troubleshoot robotic arms, replace batteries, and troubleshoot) and V.A.

contractual restraints.[516] I thus define the contestable da Vinci servicing submarket as da Vinci robot servicing that can be performed without Intuitive's proprietary tools. I define the incontestable da Vinci servicing submarket as da Vinci robot servicing that cannot be performed without Intuitive's proprietary tools.

224. Treating contestable versus incontestable da Vinci robot servicing as separate submarkets makes sense to illuminate two economic issues. First, as discussed below, Intuitive required buyers of its da Vinci robots to exclusively get their da Vinci servicing from Intuitive. Given the existence of separate submarkets, that exclusivity condition tied Intuitive's contestable da Vinci servicing to its incontestable da Vinci servicing as well as to the da Vinci robot. Second, Intuitive threatened customers who used rivals either for contestable da Vinci servicing or for EndoWrist repairs with having their Intuitive da Vinci servicing cut off.[517] The incontestable nature of much of that servicing increases the economic power of that threat, and also indicates that those threats tied incontestable da Vinci servicing to both contestable da Vinci servicing and to EndoWrist repairs.

225. However, it also makes sense to consider statistics based on grouping all da Vinci servicing (contestable and incontestable) into one single market, for several reasons. First, when Intuitive charged an hourly rate, it was the same rate regardless of whether the service was contestable or not.[518] This uniform hourly rate indicates that any foreclosure of competition for contestable servicing (via the ties and exclusionary restraints just summarized in the preceding paragraph) would prevent a constraint on hourly rates that would otherwise have lowered hourly rates for not only contestable services, but also for incontestable services. This is relevant to illuminate both the anticompetitive incentive for such restraints and the calculation of damages. Second, given the ties and exclusionary restraints just summarized, Intuitive in fact foreclosed what otherwise would have been contestable servicing and had a 100% or near-100% share of contestable da Vinci servicing. Thus, that Intuitive's threats to withhold all its da Vinci servicing drew economic power not only from the threat to withhold incontestable services, but also from combining that threat with the threat to withhold contestable services over

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[516] *Supra* Section I.B.3.i.

[517] *See*, for example, Wasfy (in *Restore*) Dep. Ex. 17 at AHS-MGMT-INTUITIVE_0000243 ("Intuitive may no longer accept your service calls for Systems that were previously serviced by an unauthorized third party."); Wasfy (in *Restore*) Dep. Ex. 23 at AHS MGMT000007 ("permitting a third party to service or modify the system entitles Intuitive to not provide service or maintenance on the System."); *infra* Sections III.A.1 and III.A.4 (discussing threats to cut off da Vinci servicing to hospitals that used rivals for EndoWrist repairs).

[518] Intuitive-00154125.

which Intuitive had near-total monopoly power. Third, it is not clear at this stage whether da Vinci's use of proprietary tools to exclude some forms of rival servicing had a legitimate rationale or was a technological tie that itself imposed an anticompetitive restraint on rival competition.[519] To the extent it is, then that technological restraint would not exist in the but-for world, and then all servicing would have been contestable in the but-for world.

5. The Relevant Geographic Market Is the United States

226. The relevant geographic market is United States, as this is the area where buyers can turn for alternate sources of supply. The da Vinci robots being serviced are located at hospitals in the United States.[520] As "a service industry, the Medical Equipment Repair and Maintenance Services Industry does not participate in international trade."[521] Reflecting this, Intuitive offered a "US" rate for its service technicians.[522]

227. I have not seen evidence that the appropriate geographic region is smaller than the United States. Intuitive offers da Vinci servicing to hospitals in all 50 states.[523] Likewise, even Restore's limited experience attempting to enter the market suggests it is nationwide. Restore's corporate offices are in Georgia,[524] but it had da Vinci service customers in Texas and Oklahoma.[525] Furthermore, regardless of whether one defines a single national market or multiple regional markets, Intuitive would have a 100% or near-100% market share, so aggregation makes sense from the perspective of economic analysis.

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[519] X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1757 (1996).

[520] While some servicing can be done remotely (e.g., Intuitive's $2,500 per call "DVSTAT Support"; "OnSite access enables Technical Support Engineers to access system logs remotely"), other servicing involves a "service call" by "Field Service Engineers". Intuitive-00154125. *See also*, Intuitive-01846020-034 at 022("When the system is connected to OnSite, remotely monitor system to diagnose potential issue and proactively dispatch a Field Service Engineer to make repairs when needed.").

[521] IBISWorld, *Medical Equipment Repair & Maintenance Services,* Industry Report OD4964, December 2021, at p. 20.

[522] Intuitive-00154125.

[523] Intuitive Service Contract Data (Intuitive-00695236, Intuitive-00706089, Intuitive-00000316).

[524] Restore-00056565; Restore-00056566.

[525] Restore-00055937; Wasfy (in *Restore*) Dep. at 11:11-15.

G. Intuitive Had Market Power and Monopoly Power in the Market for da Vinci Servicing

228. Intuitive had monopoly power in the market for da Vinci servicing throughout the United States during the entire relevant time period, and thus necessarily also had market power during this period because monopoly power is a higher degree of market power. Three independently sufficient bases confirm Intuitive's monopoly power: (1) high market shares coupled with high barriers to entry and expansion; (2) direct evidence that Intuitive had the power to raise prices above competitive levels; and (3) direct evidence that Intuitive had the power to exclude rivals. I address each of these bases in the first three sections below. In a fourth section, I show that my conclusion that that Intuitive had monopoly power remains true even if the relevant market were the servicing all MIST surgery robots or if the relevant market included both da Vinci service and da Vinci robots.

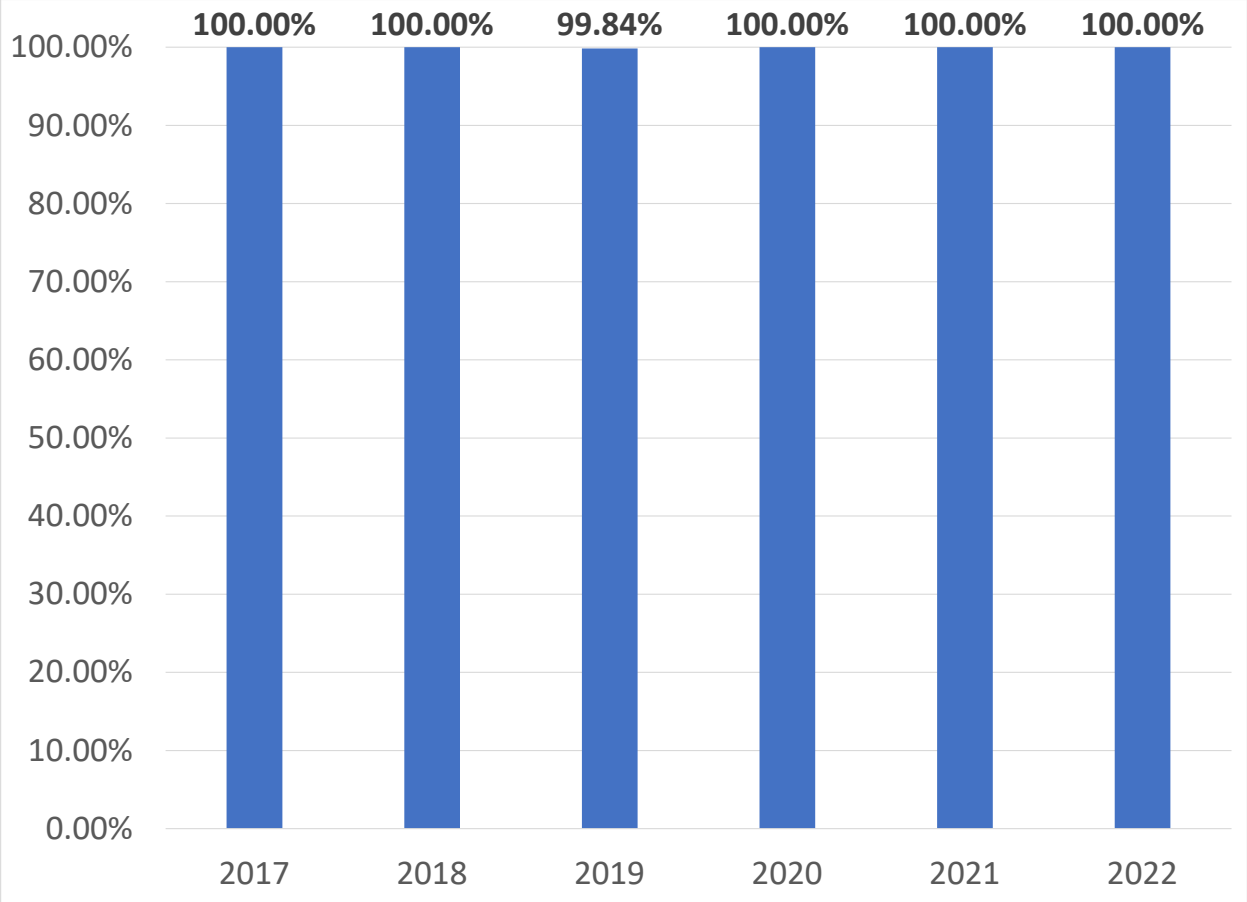
1. High Market Shares Coupled with High Barriers to Entry and Expansion

229. As noted above, a high market share indicates that a firm has monopoly power when the market also exhibits high barriers to the entry of new rivals and the expansion of existing rivals. Intuitive claimed in 2017, 2018, and 2019 to be the "sole provider of Service for the equipment; there are no other authorized Service providers."[526] Intuitive's market share was 100% throughout the Class Period, other than in a period of about one year starting in 2019, during which a single entrant, Restore, began offering service and gained no more than 0.16% of the market, after which Restore lost all its customers following Intuitive's threats to enforce its exclusionary restraints against such rival servicing.[527] See Corrected Figure 9 below.

[526] Intuitive-00326174-175 at 174; Intuitive-00157098-099 at 098; Intuitive-00165844.

[527] Restore-00055935; Restore-00055937; Restore-00055938. See the next section below for a discussion of Intuitive's successful rival exclusion.

Corrected Figure 9: Intuitive Share of da Vinci Service Revenue[528]



230. There were two types of barriers to entry and expansion. The first, and relatively smaller of the two, is technological.[529] Servicing da Vinci robots requires

[528] Source: Intuitive-00695236, Intuitive-00706089, Intuitive-00000316, Restore-00055938, Restore-00055935, Restore-00055937, Restore-0055939. The figures for 2022 reflect the fact that the lone rival has testified they no longer sell da Vinci servicing. *See* Parker (in *Restore*) Dep. (in *Restore v. Intuitive*) at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots.").

[529] Regarding the monetary cost, *see* Parker (in *In re: da Vinci*) Dep. at 167:15-22 ("Q Similar to questions I asked earlier about repairing EndoWrists, how much money did Restore invest in being able to provide service on da Vinci robots, roughly?....THE WITNESS: Hmm, you know, I've never actually done that analysis, but I'd say a hundred, 200 thousand, but I don't – I don't know that number.").

specialized knowledge.[530] To overcome this, IRCs would have to find and hire former Intuitive employees.[531] Another issue was that certain servicing procedures could be completed only by using Intuitive's proprietary laptop and software.[532] This cost of bearing the risk and uncertainty of entering a market under these conditions would represent another barrier to entry.

231. The second type of barrier to entry and expansion were those imposed by the exclusionary agreements that restrain buyers of da Vinci robots from getting them serviced by third parties. The enormity of the barriers to entry and expansion are confirmed by the reality that in the last 20 years there has been only one entrant, it was unable to gain more than a 0.16% market share, and it was driven out of the market in approximately a year.

232. Intuitive's high market share combined with barriers to entry and expansion supports an economic inference of monopoly power. As explained in more detail in Section II.C.1.iii, Intuitive's high market share (coupled with entry barriers) indicates monopoly power because it makes it more likely that Intuitive has power over price.

2. Direct Evidence of Power over Price

233. Direct evidence of Intuitive's power over pricing for da Vinci servicing also confirms Intuitive's monopoly power. The ability to increase prices above the competitive level is a hallmark of monopoly power. This means that evidence that Intuitive can raise its prices above competitive levels shows Intuitive has monopoly power.

234. One source of evidence on the ability to raise price above the competitive level is to look at competitive yardsticks or benchmarks. As a starting point, consider that Intuitive quotes $995 per hour for service, for both working time and travel time.[533] This is approximately 40 times the median hourly wage of

[530] Answer to Complaint ¶ 68 ("Intuitive admits that servicing da Vincis requires specialized training and knowledge."). *See also*, Gordon (in *Restore*) Dep. at 27:12-28:6, 29:5-12, 31:15-21, 38:3-39:4, 58:3-7.
[531] Restore was able to do so. *See* Parker (in *Restore*) Dep. at 74:18-75:8.
[532] *Supra* Section I.B.3.i.
[533] Intuitive-00154125; Madewell (in *Restore*) Dep. at 20:18-21:2.

medical equipment repairers.[534] Furthermore, third party IRCs were able to offer the same services for discounts of as much as 74% from Intuitive's price.[535] Another source of evidence on the ability to raise prices above the competitive level is to look at a firm's profit margins.[536] Profit margins for medical device repair and maintenance service for other firms were significantly lower than Intuitive's margins on service.[537]

235. As noted above, another economic method to assess market power is to use the Lerner Index, for which the best available indicator is Intuitive's internal calculation of its "contribution margin" percentage of sales.[538] Intuitive calculated that its contribution margin percentage was .82-.84 for da Vinci servicing.[539] Those indicators of Intuitive's Lerner Index for da Vinci servicing are far in excess of not only the value of around 0.1 that prevails in highly competitive markets, but also higher than the value of 0.4 to 0.5 that could prevail in reasonably competitive markets.[540] In short, Intuitive's high contribution margins indicate that Intuitive was able to maintain prices for da Vinci servicing that were well above even "reasonably" competitive levels. Indeed, they indicate that Intuitive was able to charge prices that were 180-213% above the top of the normal range for a "reasonably" competitive Lerner Index level.[541] This is well above the typical 5% threshold for a SSNIP test and a strong indicator of power over price.

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[534] U.S. Bureau of Labor Statistics, *Occupational Employment and Wages, May 2021: 49-9062 Medical Equipment Repairers*, https://www.bls.gov/oes/current/oes499062.htm (accessed 11/18/2022).

[535] *Infra* at Section VI.D.1.

[536] IIA AREEDA & HOVENKAMP, ANTITRUST LAW ¶501 (2d ed. 2002) ("the substantial market power that concerns antitrust law arises when the defendant . . . can profitably set prices well above its costs" – i.e., when they have high profit margins).

[537] *Infra* at Section VI.D.2.

[538] *See supra* Section II.C.2.

[539] *See* Intuitive-00595405.

[540] ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014) ("In a perfectly competitive market, price is driven to marginal cost, making the Lerner Index equal to zero. On the other hand, as firms gain market power, they are able to sustain price above marginal cost, leading to a higher Lerner index. In highly competitive industries, the Lerner index may be around 0.1, whereas in industries that are 'reasonably' competitive, the Lerner Index may be 0.4 or 0.5, but there is no defined rule for identifying market power.").

[541] A Lerner Index of 0.82-0.84 indicates price is 5.6-6.25 times cost. A Lerner Index of 0.5 (the top of the normal range for a "reasonably" competitive level) indicates that price is 2 times cost. Thus, Intuitive's high contribution margins of 0.82-0.84 indicate that Intuitive charged prices that were 180-213% above the top of the normal range for a "reasonably" competitive level.

236. As also discussed above, another source of evidence used by economists to evaluate market power is a firm's own-price elasticity of demand. Given the indicated Lerner Index of 0.82-0.84, the own-price demand elasticity for the da Vinci is 1.19-1.22.[542] It is never profit maximizing for a firm to price a level where its own-price demand elasticity is less than 1.[543] Accordingly, the economic literature recognizes: "the [demand] elasticity cannot be less than 1, so an estimated [demand] elasticity of less than 2 must be considered rather low."[544] Such a low own-price demand elasticity indicates that there was not close competition between Intuitive's da Vinci servicing and any other alternatives because the own-price elasticity is a function of the cross-price elasticities of demand.[545]

3. Direct Evidence of Power to Exclude

237. Evidence that a firm has been able to successfully exclude rivals directly shows that the firm has market power because only firms with market power can profitably exclude rivals. Here, the direct evidence detailed below in Section V shows that Intuitive was able to exercise a power to entirely exclude any competition from the market for servicing da Vinci robots, thus indicating monopoly power.

238. In January 2019, Restore was hired to do work on da Vinci robots.[546] It attracted the interest of hospitals and was contracted to service 15 robots.[547] Intuitive then began sending notices to hospitals, warning them not to allow Restore to service their da Vincis. These warnings reflected a direct requirement tie that required any buyer of da Vinci machines to agree not to use rivals to do any servicing of da Vinci robots and that provided that violating that exclusivity term could, among other things, result in termination of the sales agreement, voiding of the warranty on the da Vinci robot and past Intuitive servicing, and the withdrawal of all future da Vinci

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[542] This is because a profit-maximizing firms raises prices until its Lerner Index equals one divided by its own-price elasticity. *See, e.g.,* CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005). Thus, the own-price elasticity equals one divided by its Lerner Index, which here is 1/.84 to 1/.82 = 1.19 to 1.22.

[543] CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 94 (4th ed. 2005).

[544] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66(2), pp. 363-414 at 381. See also, CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 92-93 (4th ed. 2005), Table 4.1 (at p. 98).

[545] Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, ANTITRUST LAW JOURNAL, 1998, Vol. 66, pp. 363-414 at 413.

[546] Restore-00055937 (rows 43 and 44).

[547] Restore-0055937.

servicing by Intuitive.[548] For example, Intuitive warned Ardent Health Services that, among other things, "Having your Systems serviced by an unauthorized third party violates the terms of your Agreement with Intuitive" and one of the "terms of the Agreement that you might wish to consider" was that "Intuitive does not have an obligation to provide Services…on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive," i.e., third party IRCs.[549] Furthermore, Intuitive also imposed a tie that prevented users from buying replacement parts without also purchasing service from Intuitive.[550] By early 2020, Restore had lost all of its service customers. [551]

4. My Conclusions on Monopoly Power Would Not Change If the Relevant Market Were Broadened to Include All MIST Surgery Robot Servicing or to Include MIST Surgery Robots

239. My conclusions about Intuitive's monopoly power would not change if the relevant market were broadened to include not only the servicing of da Vinci robots, but also servicing of other MIST surgery robots. Because the da Vinci had over a 99.5-99.6% share of installed base of U.S. MIST surgery robots,[552] and a 99.84-100% share of servicing on da Vinci robots,[553] its share of servicing on all MIST surgery robots would necessarily likewise be an overwhelming monopoly

[548] *See infra* Sections III.A.2, III.A.4, and III.B.1.

[549] Wasfy (in *Restore*) Dep. Ex. 17 at AHS-MGMT-INTUITIVE_0000242. See also, Intuitive-01074204-207 at 206 ("We presume that you are aware that, in connection with BSW's purchase of da Vinci Surgical products, BSW entered into Sales, License, and Service Agreements (the Agreement')….Also, Intuitive does not have an obligation to provide Services (1) on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive.").

[550] Rosa (in *Restore*) Dep. at 24:5-23 ("Q. Correct. Can they just purchase the part without purchasing any service? Can they just purchase the part, the physical part? A. So I just – I'm really trying to understand your question. So they will – they will purchase a part. But it is our team who installs it…. Q. Well, you – so you talk about the part being installed. So is the part and the installation service provided together? A. To the best of my knowledge, they would be, yes.").

[551] Restore-0055937; Restore-00055938; Restore-0055939; Parker (in *Restore*) Dep. at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots.").

[552] *See supra* Table 1.

[553] *See supra* Corrected Figure 9.

share of 99.34-99.6%.[554] The barriers to entry and expansion would remain enormous, as is confirmed by the lack of successful entry and expansion by rivals. Intuitive's high profit margin would continue to provide direct evidence of a monopoly power over price. And Intuitive's exclusion of all rival service providers would continue to provide direct evidence of a monopoly power to exclude.

240. Even if the da Vinci robot and da Vinci servicing were to be considered a single "product," *competitive pricing for da Vinci servicing would still be a pricing constraint* on that single product. (This is also true even if EndoWrist repair and replacement is included into the "single product.") Rival provision of da Vinci servicing would constrain the pricing of da Vinci service.[555] This is true regardless of whether one finds separate product markets, and necessarily means that third party IRC service constrains the combined price for service and robots. Thus, third-party service would still be part of that single market (as a partial substitute) and the exclusion of such service providers would still need to be evaluated for anticompetitive effects in that single product market (albeit as potential exclusive dealing, not as tying).

241. The fact that my conclusions do not change if servicing and robots are collectively considered as one product has to do with the fact that Intuitive has monopoly power in both markets and exploits that monopoly power in both markets. This is not a situation where competition in the foremarket is constraining Intuitive from causing antitrust injury in the aftermarket. Nor does the situation here involve a razor-and-razor-blades business model where the foremarket product is sold at low (or zero) prices while the aftermarket product is sold at profitable prices. As described above, Intuitive earns high margins on both the foremarket sale of da Vinci and the aftermarket sales of da Vinci servicing.

[554] At the low end, 99.5% x 99.84% = 99.34%. At the high end, 99.6% x 100% = 99.6%.
[555] *See supra* Section II.F.4; *infra* Part V; *infra* Sections VI.D & VII.B.

III. INTUITIVE'S RESTRAINTS ON USING THIRD-PARTY SERVICE, REPAIR, OR REPLACEMENTS TIE THOSE PRODUCTS TO DA VINCI ROBOTS

A. Intuitive Tied Sales of da Vinci Robots to Restraints Against Buyers Using Rivals to Service Those Robots or to Replace or Repair EndoWrists

1. Existence of Contractual Restraints Against Rival Repair or Replacement of EndoWrists

242. That Intuitive had contractual restraints prohibiting buyers of da Vinci robots from using third parties to replace or repair EndoWrists is relatively straightforward.[556] Intuitive's answer to the Consolidated Amended Class Action Complaint (CAC) "admits that customers enter into a 'Sales, License and Service Agreement' ('SLSA') with Intuitive when they purchase or lease a da Vinci Surgical System."[557] Intuitive's answer also "admits that the SLSA prohibits customers from engaging any unauthorized third party to repair, refurbish, or recondition EndoWrists at any time and provides Intuitive with the right to void warranties associated with the da Vinci if unauthorized instruments are used with the da Vinci."[558] Finally, in its answer, "Intuitive admits that its SLSAs prohibit customers from engaging any unauthorized third party to service its da Vincis and from engaging in any unauthorized third party to repair, refurbish, or recondition EndoWrists at any time."[559] Those admissions are confirmed by documents, deposition testimony, and the language of the actual SLSA contracts.[560] These

[556] The contractual restraint against third party repair of EndoWrists was reinforced by a technological restraint in the form of a use counter which had to be reset after a certain number of uses in order for the EndoWrist to continue being used.

[557] Answer to Complaint at ¶ 3.

[558] Answer to Complaint ¶ 107. *See also id.* at ¶4.

[559] Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, 1/18/2022, at ¶ 73.

[560] *See* DeSantis (in *Rebotix*) Dep. Ex. 11 at Intuitive-00566067 ("In no uncertain terms, the standard terms of service outlined in customer contracts state that hospitals are precluded from engaging with third parties as well as the potential consequences of violation – nullification of contracts, product warranties, etc."); Vavoso (in *Rebotix*) Dep. at 195:12-16, 197:19-23 (This term of the service agreement "prohibits hospitals from using robotics repair to service EndoWrists for the Intuitive da Vinci surgical robots" and that this prohibition was "regardless of how many uses are remaining" on the EndoWrist.); Plaintiff Franciscan Alliance's 9/2019 Sales, License, and Service Agreement ("SLSA") states at §3.4: "Customer will not, nor will Customer permit any third party to, modify, disassemble, reverse engineer, alter, or misuse the System or Instruments and Accessories. Prohibited actions include, but are not limited to: (1) adding or subtracting any

provisions in the agreements to sell da Vinci robots clearly tied the sale of da Vinci robots to the exclusive provision of replacement or repaired EndoWrists by Intuitive.

243. Breaching this exclusivity contract provision regarding EndoWrist repair or replacement not only triggered whatever the standard contract remedies for damages and injunctive relief might be for such breaches, but under the contract also voided the warranty on the da Vinci robot and past servicing and triggered the explicit right of Intuitive to terminate the agreement and/or withhold future da Vinci servicing.[561] Because the contracts threatened the withholding of otherwise contracted-for da Vinci servicing to buyers who used rivals for EndoWrist repair, they also constituted a tie of da Vinci service (here, the tying product) to EndoWrist repair (here, tied product). As Intuitive described it in warning letters to a hospital it suspected of using an unauthorized third party to repair EndoWrist instruments, "only Intuitive or its authorized service providers may service these Systems and/or

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Customer or third party equipment, hardware, firmware, or software to or from the System, or (2) reconfiguring any of the Intuitive equipment . . . without Intuitive's express written permission." Intuitive-01846020-034 at 020-021. Likewise, §8 states that "Instruments and Accessories are subject to a limited license to use those Instruments and Accessories with, and prepare those Instruments and Accessories for use with, the System. . . . Any other use is prohibited, whether before or after the instrument or Accessory's license expiration, including repair, refurbishment, or reconditioning not approved by Intuitive". *Id.* at 022.

[561] For example, Plaintiff Franciscan Alliance's 9/2019 SLSA §10.1(C)(3) provides as to the "System Warranty" that "This warranty is void … to the extent Customer has used the System with surgical instruments or accessories that are not Instruments or Accessories," Intuitive-01846020, at -024, and §2.3 provides that "'Instruments and Accessories' means those instruments or accessories made or approved by Intuitive for use with the System", *id.* at -020. SLSA §3.4, which includes the ban on using repaired instruments provided by unauthorized third parties, provides that "If Customer fails to comply with the requirements of this Section 3.4, Intuitive may terminate this Agreement immediately upon written notice, and any warranties applicable to the System will become void." *Id.* at -021. Likewise, §5.2(A) of the agreement provides "Intuitive does not have an obligation to provide Services . . . on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive", §5.2(D) provides "Intuitive is not obligated to provide Services on any System for which any applicable warranty has been voided," and §5.2(E) provides: "If Customer uses the System with any surgical instrument or accessory not made or approved by Intuitive, Intuitive may discontinue Services, and any warranties applicable to any Services provided prior to any discontinuance will be void". *Id.* at -022. Use of these terms was standard in Intuitive's contracts with da Vinci customers. *Infra* at Section III.A.1; Answer to Complaint ¶ 73; DeSantis (in *Rebotix*) Deposition Exhibit 11 at Intuitive-00566067 ("In no uncertain terms, the standard terms of service outlined in customer contracts state that hospitals are precluded from engaging with third parties as well as the potential consequences of violation – nullification of contracts, product warranties, etc.").

Instruments."[562] Intuitive's warning letters further stressed that "Intuitive does not have an obligation to provide Services" to buyers who violated that contractual limitation, and those letters threatened buyers who used rivals to repair EndoWrists that "Intuitive may no longer accept your service calls".[563]

244. These contractual restraints were imposed on all class members throughout the Class Period. As noted above, Intuitive's answer to the CAC admits that all customers who bought a da Vinci robot had to enter into an SLSA and that that SLSA prohibited rival EndoWrist repairs and provided that Intuitive could void warranties and withhold service from buyers who violated those prohibitions. Intuitive's internal correspondence indicated that "the section of the contract [that] prohibits reprocessing" is "traditionally in the second sentence of section 3.4 of the Sales, License, and Service Agreement, titled 'Use of System.'"[564] Ronald Bair, Jr., of Intuitive testified that it was his understanding that this was "standard language in each sales contract that Intuitive has with hospital customers."[565] Glenn Vavoso of Intuitive testified, "Intuitive include[s] that term in each of the sales contracts that it requires hospitals to sign" and was not "aware of any contract with any hospital that did not include this use of system term [i.e., Section 3.2]."[566] Marshall Mohr, who had been CFO of Intuitive from March 2006 to January 2022,[567] testified that these contractual restrictions on rival EndoWrist repair had been in place "[a]s long as I can remember -- as long as I've been CFO for sure."[568] This evidence thus clearly shows that these contractual restraints applied to all class members throughout the Class Period.

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[562] Wasfy (in *Restore*) Dep. Ex. 17 at AHS_MGT-INTUITIVE_0000241 (January 17, 2020 warning letter from Intuitive to Ardent Health Services). *See also id.* at -242 (quoting contractual provisions specifying that restraint on rival da Vinci servicing or EndoWrist repair).

[563] *Id.* at -242 to -243; Answer to Complaint ¶ 82 ("on January 17, 2020, [Intuitive SVP and General Counsel] Kara Andersen Reiter and [Intuitive VP] Romain Denis notified Ardent Health Services that Intuitive "understand[s] that Ardent Health Services is using or considering using 'refurbished' EndoWrist® instruments, obtained from and/or modified by a third party for use beyond the programmed number of uses" and that '[b]ased on the terms of the Agreement and the patient safety implications of the Systems being used with instruments refurbished by an unauthorized third party, Intuitive may no longer accept your service calls for such Systems.'").

[564] Bair (in *Rebotix*) Dep. at 99:10-100:8, Ex. 14 at Intuitive-00361133-134.

[565] Bair (in *Rebotix*) Dep. at 100:5-8.

[566] Vavoso (in *Rebotix*) Dep. at 195:8-11.

[567] M. Mohr (in *In re: da Vinci*) 30(b)(6) Dep. at 9:23-10:11.

[568] *Id.* at 57:20-58:3 ("Q. And the same question for paragraph 4, how long has the prohibition [on third party repair] with respect to EndoWrists been in place? A. The same answer."). Marshall Mohr first started as CFO in 2006 (*Id.* at 6-7).

2. Existence of Contractual Restraints Against Rival Servicing of da Vinci Robots

245. That Intuitive had contractual restraints prohibiting buyers of da Vinci robots from using third parties to service da Vinci robots is also relatively straightforward. Intuitive's answer to the CAC "admits that customers enter into a 'Sales, License and Service Agreement' ('SLSA') with Intuitive when they purchase or lease a da Vinci Surgical System" and that "the SLSA prohibits customers from engaging any unauthorized third party to service the da Vinci."[569] In its answer, Intuitive also "admits that its SLSAs prohibit customers from engaging any unauthorized third party to service its da Vincis" and "Intuitive admits that its SLSAs include a right for Intuitive to void the service contract of any customer that uses unauthorized third-party service, repair or maintenance for its da Vinci."[570] These provisions in the agreements to sell da Vinci robots clearly tied the sale of da Vinci robots to the exclusive provision of da Vinci robot servicing by Intuitive.

246. Those admissions by Intuitive are confirmed by the language of Intuitive's SLSA with buyers.[571] Breaching this exclusivity contract provision on da Vinci servicing not only triggered whatever the standard contract remedies for damages and injunctive relief might be for such breaches, but under the contract also voided the warranty on the da Vinci robot and past servicing and triggered the explicit right of Intuitive to terminate the agreement and/or withhold future da Vinci servicing.[572] Intuitive enforced those provisions by threatening customers who used

[569] Answer to Complaint ¶ 3.
[570] *Id.* ¶ 73.
[571] *See* DeSantis (in *Rebotix*) Dep. Ex. 11 at Intuitive-00566067 ("In no uncertain terms, the standard terms of service outlined in customer contracts state that hospitals are precluded from engaging with third parties as well as the potential consequences of violation – nullification of contracts, product warranties, etc."); Plaintiff Franciscan Alliance's 9/2019 Sales, License, and Service Agreement ("SLSA") states at §3.4: "Customer will not, nor will Customer permit any third party to, modify, disassemble, reverse engineer, alter, or misuse the System or Instruments and Accessories. Prohibited actions include, but are not limited to: (1) adding or subtracting any Customer or third party equipment, hardware, firmware, or software to or from the System, or (2) reconfiguring any of the Intuitive equipment . . . without Intuitive's express written permission." Intuitive-01846020-034 at 020-021.
[572] For example, Plaintiff Franciscan Alliance's 9/2019 SLSA §5.2(A) provided "Intuitive does not have an obligation to provide Services . . . on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive", §5.2(D) provides "Intuitive is not obligated to provide Services on any System for which any applicable warranty has been voided," §5.2(E) provides: "If Customer uses the System with any surgical instrument or accessory not made or approved by Intuitive, Intuitive may discontinue Services, and any warranties applicable to any Services provided prior to any

rivals for any da Vinci servicing with having their Intuitive da Vinci servicing cut off.[573] Because the contracts and Intuitive threatened the withholding of otherwise contracted-for da Vinci servicing to buyers who used rivals for da Vinci servicing, they also constituted a tie of incontestable da Vinci servicing (here, the tying product) to contestable da Vinci servicing (here, tied product), given that Intuitive used proprietary tools to prevented rivals from providing the incontestable servicing.[574]

247. These contractual restraints were imposed on all class members present throughout the Class Period. As noted above, Intuitive's answer to the CAC admits that all customers who bought a da Vinci robot had to enter into an SLSA and that that SLSA prohibited the use of rival da Vinci servicing and provided that Intuitive could withhold service from buyers who violated this prohibition. Marshall Mohr, who had been CFO of Intuitive from March 2006 to January 2022,[575] testified that the contractual restriction on rival da Vinci servicing had been in place "[a]s long as I can remember -- as long as I've been CFO for sure."[576] This evidence thus clearly shows that these contractual restraints applied to all class members throughout the Class Period.

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discontinuance will be void". Intuitive-01846020, at -022. For the same provisions in other SLSA contracts with hospitals, *see* Madewell (in *Restore*) Dep. Ex. 3 at PANAMACITY000036-037; Intuitive-00299311-326 at 313; Intuitive-01846020-034 at 022; Intuitive-01989020-038 at 028. *See also* DeSantis (in *Rebotix*) Deposition Exhibit 11 at Intuitive-00566067 ("In no uncertain terms, the standard terms of service outlined in customer contracts state that hospitals are precluded from engaging with third parties as well as the potential consequences of violation – nullification of contracts, product warranties, etc.").

[573] *See*, for example, Wasfy (in *Restore*) Dep. Ex. 17 at AHS-MGMT-INTUITIVE_0000242 ("Intuitive may no longer accept your service calls for Systems that were previously serviced by an unauthorized third party."); Wasfy (in *Restore*) Dep. Ex. 23 ("permitting a third party to service or modify the system entitles Intuitive to not provide service or maintenance on the System.").

[574] *See supra* Sections I.B.3.i and II.F.4.

[575] Mohr Dep. at 9:23-10:11.

[576] Mohr Dep. at 57:20-24 ("Q. How long -- let's turn back to paragraph 3 [Intuitive's admissions about the SLSA prohibiting unauthorized third party service of da Vincis]. How long has the prohibition paragraph 3 been in place at Intuitive Surgical? A. As long as I can remember -- as long as I've been CFO for sure"). He began his tenure as CFO in 2006. *Id*. *See also*, Vavoso (in *Rebotix*) Dep. at 212:17-212:24 ("Q. We'll talk about that in just a moment. The contract that we looked at just a moment ago [Vavoso (in *Rebotix*) Dep. Ex 24, which contained the §5.2(A) language] – and I can screen share it again if that's helpful – but is that contract representative of the sales contracts that Intuitive and its hospital customers signs? MS. LENT: Objection; asked and answered. THE WITNESS: Yes.").

3. Existence of Contractual Restraints Against Using EndoWrists for More Than the Use Limit Set by Intuitive

248. Intuitive's agreements with hospitals also had a contractual condition that restrained buyers from using EndoWrists for more than the use limit set by Intuitive. For example, section 8 of the SLSA with Franciscan Alliance provided that the license to use EndoWrist instruments "expires once an Instrument or Accessory is used up to its maximum number of uses, as is specified in the Documentation accompanying the Instrument or Accessory."[577] Glenn Vavoso of Intuitive testified that section 8 "appear[s] in each of the sales contracts that Intuitive has with hospitals who purchase the da Vinci surgical robot."[578] Moreover, using a third party to reset the use limit on an EndoWrist counted as a violation of the SLSA exclusivity provisions prohibiting repairs by third parties and prohibiting the use of instruments repaired by third parties.[579] It thus triggered the same contractual provisions allowing Intuitive to void the da Vinci sales agreement, void the warranties, and deny future da Vinci servicing.[580] As Intuitive described in a warning letter to a hospital it suspected of using repaired EndoWrists, "the servicing [of da Vinci Surgical System instruments, such as EndoWrists] by any unauthorized third party, will void the warranty for the instrument, accessory, System, and/or associated services."[581] Intuitive's expert in the Rebotix case acknowledges that

[577] Intuitive-01846020, at -022 to -023, §8.

[578] Vavoso (in *Rebotix*) Dep. at 198:18-199:2 ("MR. ERWIG: Q. This paragraph, paragraph 8, does this appear in each of the sales contracts that Intuitive has with hospitals who purchase the da Vinci surgical robot? A. To my knowledge, yes. Q. Is it your understanding, is – withdrawn. As Intuitive's 30(b)(6) witness, can you identify any sales contract with the hospital that does not include the language in paragraph [i.e., section] 8? A. No.").

[579] For example, Plaintiff Franciscan Alliance's 9/2019 SLSA §3.4 provided "Prohibited actions include, but are not limited to . . . reconfiguring any of the Intuitive equipment, Hardware, firmware, or Software as originally provided to Customer as part of the System without Intuitive's express written permission." Intuitive-01846020, at -021.

[580] For example, Plaintiff Franciscan Alliance's 9/2019 SLSA § 3.4 provided: "If Customer fails to comply with the requirements of this Section 3.4, Intuitive may terminate this Agreement immediately upon written notice, and any warranties applicable to the System will become void." Intuitive-01846020, at -021. Section 5.2(A) of that same agreement provided "Intuitive does not have an obligation to provide Services . . . on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive". Intuitive-01846020, at -022. And Section 5.2(D) provided: "If Customer uses the System with any surgical instrument or accessory not made or approved by Intuitive, Intuitive may discontinue Services, and any warranties applicable to any Services provided prior to any discontinuance will be void." Intuitive-01846020, at -022.

[581] Intuitive-00019774-775 at 775 (May 7, 2019 warning letter from Intuitive to Pacific Coast Surgical Center).

Intuitive has consistently restricted the use of EndoWrists since 2001.[582] This evidence indicates that Intuitive's restraints on EndoWrist uses applied to all class members throughout the Class Period.

4. Intuitive Monitored and Enforced Its Restraints Against Third-Party Repair and Servicing

249. Intuitive had the capability of monitoring compliance with its restraints. Intuitive's staff would internally flag when they spotted third-party repairs to EndoWrists.[583] Intuitive would also monitor whether third parties had done or tried to do repairs on the da Vinci robots.[584] Spotting EndoWrist repairs was possible because of the voluminous data collected by the da Vinci robot, many of which were connected to Intuitive's cloud "to enable proactive monitoring."[585] Intuitive tracked the use counter by EndoWrist over time in order to identify repaired instruments.[586]

250. Intuitive had a multi-step process it would use when it learned that a hospital was using third party repair of EndoWrists or servicing of da Vinci robots.[587] Intuitive would usually start with a conversation, then a formal letter, then stop servicing and providing instruments (e.g., EndoWrists), and ultimately void the da

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[582] *See* Loren Smith (in *Rebotix*) 8/30/2021 Report at ¶ 69.

[583] *See*, for example, Bair (in *Rebotix*) Dep. Ex. 14 at Intuitive-00361136 ("Wasn't sure if you were able to take a look at this week's report yet but looks like Baylor Surgicare has restarted their reprogrammed instruments activities.").

[584] Wasfy (in *Restore*) Dep. Ex. 9 and at p. 31.

[585] Intuitive Surgical Form 10-K, FY2020, at p.6 ("The vast majority of our systems are connected to the Intuitive cloud to enable proactive monitoring and provide software updates.").

[586] *See*, e.g., Bair (in *Restore*) Dep. Ex. 1 ("I…wanted to make sure you're aware that you have third party reprocessed instruments in use at the Panama City Surgery Center" and "Here are the results of the Instrument Report query for this week."); Bair (in *Rebotix*) Dep. Ex. 14 at Intuitive-00361136 ("Wasn't sure if you were able to take a look at this week's report yet but looks like Baylor Surgicare has restarted their reprogrammed instruments activities."); Intuitive-01020015-017; Intuitive-01020019. *See also*, Intuitive Surgical, Inc.'s Responses and Objections to Plaintiffs' Amended First Set of Interrogatories, July 22, 2022, at 16 ("the following information can be collected when an EndoWrist is attached to a da Vinci system for surgical use: The Da Vinci Surgical Robot stores binary formatted machine data that includes time stamped events, a system identifier, various component data (serial numbers, voltages and firmware), instrument data….Data is stored locally on the Da Vinci Surgical Robot and at the Intuitive data center. Field Service Engineers upload system data after each service event.").

[587] DeSantis (in *Rebotix*) Dep. at 268:20-22 ("Q And if the hospital continued using Rebotix, then Intuitive would send a letter; right? A We laid out a multistep process…").

Vinci warranty.[588] Intuitive's internal documents outline a specific timeline for each step.[589] Such threats and warnings proved sufficient to end hospital use of rivals to repair EndoWrists or service da Vinci robots, and it appears that Intuitive thus never needed to resort to a breach of contract lawsuit for damages or injunctive relief.

251. There are numerous examples of Intuitive using these steps to enforce the restraints. Intuitive's representative testified that "we aggressively pursue the terms of our agreement."[590] For example, Intuitive informed Ardent Health Services that if Ardent used repaired EndoWrists then Intuitive "may no longer accept your service calls for" da Vinci robots.[591] Tyler McDonald, director of surgical services at Conway Regional Health System, was on the receiving end of these steps, leading up to the termination of their sales and service agreement with Intuitive.[592] Intuitive also sent warning letters to IRCs, such as the February 2019 one it sent to Restore alleging that Restore's actions were violating the law (e.g., by not having 510(k) clearance).[593]

252. Intuitive was effective in enforcing these restraints, as evidenced by the response of hospitals. Glenn Vavoso of Intuitive indicated that there were no instances "where a hospital continued using Rebotix's services after receiving these letters from Intuitive."[594] Similarly, all of Restore's service customers left after

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[588] Vavoso (in *Rebotix*) Dep. at 213:19-214:24 (e.g., "A. Uhm, usually it will start with [sic] conversation…Starts with that discussion. If they continue to be in breach…we will then follow with a letter…and it could ultimately escalate to…stop service and stop supply instrumentation" "It is the general process that we follow."), 223:21-224:19 (e.g., "MR. ERWIG: Q. And if a hospital refurbishes EndoWrists using Rebotix, then Intuitive will ultimately void that warranty, right?...THE WITNESS: Yes."); DeSantis (in *Rebotix*) Dep. at 262:6-23 (e.g., "if they do not comply with that [i.e., if customers use third party service], then we [Intuitive] won't have a relationship with them going forward which would include we won't service and we won't provide consumables."), 267:19-269:3 (e.g., "Q And if the hospital continued using Rebotix, then Intuitive would send a letter; right? A We laid out a multistep process that would eventually get to the point where we didn't want to get to…. Then again, if the hospital continued to use something that we felt was unauthorized, unsafe, we would terminate our relationship with the hospital.").

[589] Antonio Inacay 6/8/2021 Dep. (Intuitive), *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, No. 8:20-cv-2274 (M.D. Fla.), Ex. 7 at Intuitive-00439336; Inacay (in *Rebotix*) Dep. at 162:2-164:3.

[590] Bair (in *Rebotix*) Dep. at 136:24-137:5.

[591] Answer to Complaint ¶ 82.

[592] McDonald Dep. at 8:3-5, 9:3-5, 22:5-19 and Ex. 3. *See also*, Intuitive-00110184-188 at 187 ("Conway's Escalation Timeline" from "1st reprogrammed use – Sep 20, 2018" through multiple correspondence to "Conway receives final termination notice – Jul x, 2019.").

[593] Intuitive-00478439-444.

[594] Vavoso (in *Rebotix*) Deposition at 226:18-22.

Intuitive became aware of the situation.[595] Imron Zafar, an equity research analyst covering medical technology, testified that "fear of violating the contract" had a deterrent effect on hospitals.[596]

253. It is not surprising that hospitals caved to Intuitive's demands, because Intuitive had the capability of rendering the da Vinci robot unusable. Intuitive had several ways of doing so. First, Intuitive could refuse to service da Vinci robots.[597] Because of Intuitive's propriety tools, only Intuitive was able to provide many of the services necessary to fully maintain a da Vinci.[598] As Ed Harrich of Pullman Regional Hospital noted, "[i]f we couldn't have the preventative maintenance, we'd stop using" the da Vinci.[599] As with many devices, without maintenance and repairs it will ultimately fail. Second, Intuitive could suspend the availability of instruments, including replacement EndoWrists.[600] A lack of instruments would ultimately prevent the hospital from being able to continue performing surgeries. Consistent with these factors, hospital personnel at Hillcrest Medical Center indicated that Intuitive told them they needed to get all their da Vinci servicing from Intuitive because otherwise Intuitive could turn their da Vinci robot "into a paperweight at any given moment."[601] This threat was particularly powerful because these da Vinci robots cost around $1.5 million dollars each and were necessary to perform vital surgeries.[602]

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[595] *Supra* II.G.1 and *infra* V.C.

[596] Zafar (in *In re: da Vinci*) Dep. at 7:9-17; 106:23-107:4.

[597] *See, e.g., supra* at Sections III.A.1-3.

[598] *Supra* Sections I.B.3.i and II.F.4.

[599] Harrich (in *Rebotix*) Dep. at 77:13-24 ("Q. If Intuitive would not perform preventative maintenance on your robot, does your robot have any use at all? […] THE WITNESS: It would have not use at all. […] Q. If Intuitive refused to provide maintenance on your da Vinci robot, could the da Vinci robot be used for any surgeries? A. No. If we couldn't have the preventative maintenance, we'd stop using it."). *See also*, Bair (in *Rebotix*) Deposition, May 24, 2021 at 136:2-5 ("Q. So if Intuitive doesn't service that robot and the robot fails, it means the hospital can no longer do surgeries with that robot; right? A. That is correct."); McDonald (in *Restore*) Deposition, May 7, 2021 at 19:10-20.

[600] *See*, *e.g*. Parker (in *Restore*) 30(b)(6) Dep. at 106:22-107:1 ("And then they started getting threats and pushback from Intuitive, you know, telling them that they…would not be able to buy, you know, disposables. They would not be able to buy instruments.").

[601] Dickens (in *Restore*) Deposition at 6:2-4, 20:3-19.

[602] Intuitive Surgical Form 10-K, FY2021, at p. 70 ("The da Vinci Surgical System ASP, excluding the impact of systems placed under operating lease or usage-based arrangements and Ion systems, was approximately $1.55 million for the year ended December 31, 2021, compared to approximately $1.50 million for the year ended December 31, 2020.").

254. Intuitive's enforcement of these contractual terms was enhanced because it was able to threaten to withhold crucial inputs necessary to use the da Vinci. First, Intuitive threatened to withhold da Vinci service if hospitals used third party repaired EndoWrist or used EndoWrists for more than Intuitive's specified use limit.[603] This was particularly effective because Intuitive's proprietary tools meant only it could provide many types of da Vinci servicing.[604] Second, Intuitive threatened to withhold new EndoWrist replacements if hospitals used third party da Vinci service, and only Intuitive could provide new EndoWrist replacements.[605] Third, Intuitive sold da Vinci robot replacement parts only with the provision of da Vinci service.[606]

B. Intuitive's Restraints Against Third-Party da Vinci Servicing and EndoWrist Repair and Replacements Constitute Ties

255. Intuitive's restraints against third-party da Vinci servicing and EndoWrist repair and replacement constituted ties of da Vinci robots (the tying product) to, respectively, da Vinci servicing and EndoWrist repair and replacement (the tied products). As described above, these are in two separate aftermarkets which are separate from the primary market for da Vinci robots.[607] As described in the section below, Intuitive's restraints forced da Vinci robot customers to also purchase from Intuitive in these separate aftermarkets, which leads to the conclusion that these restraints constitute ties. Moreover, Intuitive's contracts imposed two other ties.

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[603] *See*, e.g., Answer to Complaint ¶ 82 ("on January 17, 2020, [Intuitive SVP and General Counsel] Kara Andersen Reiter and [Intuitive VP] Romain Denis notified Ardent Health Services that Intuitive "understand[s] that Ardent Health Services is using or considering using 'refurbished' EndoWrist® instruments, obtained from and/or modified by a third party for use beyond the programmed number of uses" and that '[b]ased on the terms of the Agreement and the patient safety implications of the Systems being used with instruments refurbished by an unauthorized third party, Intuitive may no longer accept your service calls for such Systems.'"); Parker (in *Restore*) 30(b)(6) Dep. at 106:22-24 ("And then they started getting threats and pushback from Intuitive, you know, telling them that they would lose access to service.")

[604] *Supra* Sections I.B.3.i and II.F.4.

[605] Vavoso (in *Rebotix*) Dep. at 59:4-14, 242:2-23 ("the only entity that sells EndoWrists to hospitals is Intuitive.").

[606] David Rosa (in *In re: da Vinci*) Dep. at 24:5-23 ("Q. Correct. Can they just purchase the part without purchasing any service? Can they just purchase the part, the physical part? A. So I just – I'm really trying to understand your question. So they will – they will purchase a part. But it is our team who installs it…. Q. Well, you – so you talk about the part being installed. So is the part and the installation service provided together? A. To the best of my knowledge, they would be, yes.").

[607] *See supra* Sections II.D and II.F.

First, because the contracts required buyers to buy all their da Vinci servicing from Intuitive, they also tied incontestable da Vinci servicing (here, the tying product) to contestable da Vinci servicing (here, the tied product).[608] Second, because the contracts threatened the withholding of all da Vinci servicing from buyers who used rivals for EndoWrist repair or replacement, they also tied all da Vinci servicing (here, the tying product) to EndoWrist repair or replacement (here, the tied product).[609]

1. Intuitive Forces da Vinci Users to Stop Using Third Parties for da Vinci Servicing or EndoWrist Repair or Replacement

256. In antitrust economics, a seller engages in "tying" when it refuses to sell one product unless the buyer also takes another product from the seller.[610] Here, Intuitive engaged in multiple ties that were mutually reinforcing. First, Intuitive refused to sell the da Vinci robot (the tying product for these ties) unless buyers agreed not to get da Vinci servicing or EndoWrist repair/replacement (the tied products for these ties) from any firm other than Intuitive. Second, Intuitive reinforced these ties with other ties by refusing to provide da Vinci servicing or instruments (the tying products for these ties) to buyers who got EndoWrist repairs (the tied product) from a rival.[611] Third, Intuitive further reinforced these ties by tying its incontestable da Vinci servicing (the tying product for this tie) to contestable da Vinci servicing (the tied product for this tie), which exacerbated Intuitive's monopoly power in the da Vinci servicing market that it used to enforce the other ties.[612]

257. These ties were all "requirements ties", which are a particularly restrictive type of tie because they require buyers to make *all* of their purchases in the tied market from the defendant.[613] Requirements ties are thus more restrictive

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[608] *See supra* Sections III.A.2 and III.A.4.

[609] *See supra* Sections III.A.1 and III.A.4.

[610] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 464 (4th ed. 2022) ("Tying is a refusal to sell one product unless the buyer also takes another product from the seller. The product that will not be sold without the other is called the tying product, and generally it is the product in which the defendant has the greatest market power. The tied product is the one that buyers have to take from the seller to get its tying product").

[611] *See supra* Sections III.A.1 and III.A.4.

[612] *See supra* Sections III.A.2 and III.A.4.

[613] Elhauge, *Rehabilitating Jefferson Parish: Why Ties Without a Substantial Foreclosure Share Should Not Be Per Se Legal*, 80 ANTITRUST LAW JOURNAL 463, 472 (2016) (a "requirements tie [is] a tie that requires the buyer to make all its tied product purchases from the defendant."); Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARVARD LAW REVIEW 397, 409-11 (2009).

than "unit-to-unit" ties, which require only that the buyer purchase a certain number of units of the tied product from the defendant each time it purchases one unit of the tying product from the defendant.

258. The limited historical use of repaired EndoWrists or third-party servicing of da Vincis does not negate the tying. That limited historical use simply reflects the fact that a small number of hospitals were willing to violate their tying agreements by using a limited number of EndoWrists repairs or da Vinci servicing performed by third party IRCs before Intuitive enforced its tying agreements in a way that coerced them into stopping. These tying agreements prevented use of rival tied products for decades, restrained the limited use that prevailed for short periods to very low levels, and ultimately were successfully enforced to eliminate even that low level of rival usage.

2. Hospitals' "Agreement" to the Tying Restraint Is Irrelevant

259. That hospitals "voluntarily" and/or "knowingly" agreed to the tie (by signing onto the sales agreement when buying the da Vinci) does not affect the economics of the tying restraint here because their agreement was procured by tying those restraints to access to monopoly products. Intuitive has monopoly power in the MIST surgery robot foremarket. As discussed above in Section II.B.1, the da Vinci is a "must-have" product with 100% penetration among leading hospitals. Intuitive also has monopoly power in the servicing of da Vinci machines, as well as monopoly power in EndoWrist repair and replacement and in da Vinci servicing.

260. Moreover, collective action problems mean that hospitals had little incentive to bear the individual burden of losing access to monopoly products in order to reject an anticompetitive tie that collectively imposed harm on all buyers in the market by foreclosing rival competition. Instead, hospitals have individual incentives to free ride by agreeing to exclusionary terms rather than bear a penalty to contribute to a collective action to stop the anticompetitive effects on the entire market.[614]

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[614] Einer R. Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253, 284-285 (2003) (citing MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION (2d ed. 1971); RUSSELL HARDIN, COLLECTIVE ACTION (1982)). *See also* MICHAEL D. WHINSTON, LECTURES ON ANTITRUST ECONOMICS 144–47, 166 (2006); Joseph Farrell, *Deconstructing Chicago on Exclusive Dealing*, 50 ANTITRUST BULL. 465, 476 (2005); Louis Kaplow & Carl Shapiro, *Antitrust*, *in* 2 HANDBOOK OF LAW & ECONOMICS 1073, 1203–10 (A. Mitchell Polinsky & Steven Shavell eds., 2007); Eric B. Rasmusen, J. Mark Ramseyer & John S. Wiley, Jr., *Naked Exclusion*, 81 AM. ECON.

IV. INTUITIVE'S TYING AND EXCLUSIVITY RESTRAINTS FORECLOSED RIVALS FROM REPAIRING ENDOWRISTS

261. Intuitive's tying and exclusivity restraints foreclosed the entire market for the repair and replacement of EndoWrists. That foreclosure deterred entry, limited the little entry that occurred to selling to the few hospitals willing not to comply with those restraints, and ultimately drove those few entrants out of the market by enforcing those restraints. The excluded and limited entrants had the ability to repair EndoWrists, as evidenced by the fact that the few firms that temporarily entered before being driven out were able to successfully provide EndoWrist repairs or repaired EndoWrists. No factors other than these challenged restraints can explain the lack of successful entry into the U.S. market for EndoWrist repair and replacement. The foreclosure caused by the challenged restraints began before the start of the Class Period in 2017 and continues to foreclose entry to this day. I expand on each of these themes in the sections that follow.

A. Actual Third-Party Rivals Were Capable of Repairing EndoWrists

262. Third-party rivals had the ability to repair EndoWrists for S and Si models, and in fact exercised it when doing repairs for the few hospitals that, for a time, were willing not to comply with Intuitive's restraints. These repairs included resetting the use counter, as well as other things like sharpening and realignment.[615] Resetting the use counter constitutes a repair because it creates a well-functioning EndoWrist with additional uses. Rebotix developed a method of repair which it used (for itself and on behalf of distributor SIS) and licensed to Restore, which also performed repairs.[616] Rebotix even obtained patents for its repair method.[617] Restore

REV. 1137 (1991); Ilya R. Segal & Michael D. Whinston, *Comment, Naked Exclusion*, 90 AM. ECON. REV. 296 (2000).

[615] See discussion in Section I.B.3.ii above.

[616] [redacted]

[617] REBOTIX067732, REBOTIX067733-734 at 733 ("Whereas, Rebotix has several issued patents related to that technology [extending the life of an Intuitive detachable robotically controlled device], including US Patent No. 9,527,208 and 9,247,996").

later developed its own method, but was unable to offer it to customers before Intuitive's actions excluded it from the market.[618] This rival competition in EndoWrist repair was short-lived because, as Glen Papit of Rebotix noted, "as soon as the OEM [Intuitive] recognized what we [Rebotix] were doing, they made a very forceful push to stop us."[619]

263. Third-party rivals have indicated that they also had the ability to repair EndoWrists for X and Xi models. It is my understanding that the technical hurdles to repair are the same as the S/Si-compatible EndoWrists, just that a different chip is being used to implement the use counter.[620] Consistent with this understanding, Stan Hamilton testified that Rebotix had successfully by-passed the Xi chip, and what is left is to release it into the market.[621] Restore is currently developing a way to reset the use counters in Xi-compatible EndoWrists.[622] Given the similarities in

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[618] Parker (in *In re: da Vinci*) Dep. at 130:6-23 ("A We were not, we stopped using Rebotix's repair technology in October of 2019, and then we've started developing our own December of 2019, January of 2020. Q You have not reset any EndoWrists with Restore technology since that time; correct? A Not for hospitals, just for internal testing purposes. Q Why haven't you reset any EndoWrists for hospitals in that time frame? A It's futile. If we do that, then Intuitive goes to the hospital and threatens to end their contracts, threatens to not sell them instruments, not sell them accessories, threatens to move their doctors to other hospitals, et cetera. Q And you say that because that's what Intuitive has done in the past? A Correct.").

[619] Papit (in *Rebotix*) 30(b)(6) Dep. at 237.

[620] Mandel Report, ¶ 9; Parker (in *In re: da Vinci*) Dep. at 134:1-7 ("The only difference between the Si and the Xi [compatible EndoWrist] is that housing, the Xi is rotated 90 degrees. The Si instrument connects to the robot with four contact pins, whereas the Xi connects via RFID, so the only real difference is the difference between four pogo connector pins and RFID for communication between the counter and the robot arm."), 142:6-8 ("And then, secondarily, the Xi is extremely similar to the Si with one exception, and that's RFID versus direct contact…"); May 11/3/2022 Dep. at 48:1-2 ("A. Well, since the – the [Xi EndoWrist] counter uses RFID and communicates with the robot…").

[621] Hamilton (in *In re: da Vinci*) Dep. at 42:1-42:9 ("So from a technical perspective today – as of today, Rebotix has figured out how to reset the usage counter for Xi instruments. Is that what you're saying?....THE WITNESS: I agree. Yes."), 39:16-39:25 ("Q…Are you saying that from a technical standpoint, Rebotix has actually reset the usage calendar of an Xi EndoWrist instrument as of today? MR. ERWIG: Object to form. THE WITNESS: I'm not sure how you're even defining that. Have we done that in the marketplace? I said no. Have we done the technical equivalent of that. I say yes. And there are many steps between the technical equivalent and releasing it into the marketplace."). *See* also, REBOTIX171287-288 at 287 (Regarding the "next generation" EndoWrists (i.e., Xi-compatible), Rebotix had "Sufficient confidence in success" and that "initial analysis suggests success is possible").

[622] *See*, e.g., Parker Declaration at ¶ 5 ("Restore is continuing to fund the development of technology to reset the usage counter on the Xi EndoWrists."); May (in *In re: da Vinci*) Dep. at

the types of graspers, cutters, etc. used as EndoWrists on the da Vinci S/Si and X/Xi, the other types of repairs developed for the S/Si-compatible EndoWrists would have had direct application to the X/Xi-compatible EndoWrists.[623]

264. Economic data suggests that, absent Intuitive's conduct, firms would have the incentive to develop a way to reset the counter for X/Xi compatible EndoWrists.[624] EndoWrist margins were high, as shown in Section II.E.2 above, and economic theory predicts that high margins usually induce entry.[625] Glenn Papit of Rebotix estimated the cost to develop the repair method for S/Si EndoWrists and partially complete work on X/Xi EndoWrist repair was $5 million.[626] This is far below the profits one could earn from developing such a repair method, given the annual revenue of $250-350 million that Keith Johnson of SIS estimated could, absent Intuitive's exclusionary conduct, have been earned repairing Si EndoWrists alone.[627]

89:5-9 ("Q. Just to make sure I understand this correctly, you testified earlier that Restore has begun developing the technology to bypass the X and Xi chip? A. That's correct.").

[623] One example of this can be seen in the names and categories given in the instrument catalogs of the da Vinci S/Si and X/Xi. *See*, e.g., Intuitive-00000105-128 and Intuitive-00000129-156. Stan Hamilton of Rebotix testified "one of the monopolar curved scissors for the Si, there's an equivalent-type instrument for Xi." Hamilton (in *In re: da Vinci*) Dep. at 23:8-10. Marks (in *Restore*) Dep. at 27:10-28:4 (talking about his work with Restore to refurbish instruments, "[m]y understanding of the process is, is that they take the EndoWrist and they reprogram the microchip that's on it to give us the set number of lives, but all of the lives and not just -- I mean, it doesn't self-destruct at the end. In the process, they verify the function of the device. Like I say, if the -- if the forceps were, you know, misaligned, they realign them. If the scissors were, you know, dull, then they were sharpened again, just like we would do for any other, you know, surgical instrument that we use in the hospital, and then we'd get those back.").

[624] Even if it is technically feasible for a rival to enter, raising rivals' costs can still have an anticompetitive and/or exclusionary effect. *See*, for example, Thomas G. Krattenmaker & Stephen C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price*, 96 YALE L.J. 209, 234–45 (1986); Stephen C. Salop & David T. Scheffman, *Raising Rivals' Costs*, 73 AM. ECON. REV. 267 (1983) (Special Issue).

[625] PINDYCK & RUBINFELD, MICROECONOMICS 377 (8th ed. 2013) ("Large short-run profits can induce new firms to enter an industry"); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 116 (4th ed. 2005) ("In most markets, positive economic profits would attract new entrants.").

[626] Papit (in *Rebotix*) Declaration at ¶¶ 4-5.

[627] Johnson (in *In re: da Vinci*) Dep. at 57:4-10. *See also* Parker (in *Restore*) 30(b)(6) Dep. at 115:24-116:9 (testifying that, just on the limited sales of EndoWrist repair that third party IRCs made in the actual world, those third parties had profits "in the hundreds of thousands, if not low millions.")

B. Intuitive's Conduct Foreclosed the Entire Market for EndoWrist Repair and Replacement

265. Every buyer of EndoWrist repair and replacement was subject to tying and exclusionary agreements that restrained their ability to buy from rivals,[628] so the foreclosure share was 100%. The fact that some hospitals temporarily were willing not to comply with their restraints does not mean they were not subject to restraints, especially since Intuitive was able to bring them all into compliance by enforcing those restraints.[629]

266. Even if one were to conservatively treat as unforeclosed the breakthrough sales that some third-party IRCs were temporarily able to obtain in violation of these restraints, before Intuitive closed them down by enforcing its restraints, the foreclosure share was still enormous, over 99.8% in each year. See Table 2 above.

267. The dollar amount of foreclosure was likewise enormous. From the start of the Class Period through the end of 2021, in the U.S. Intuitive sold over $1 billion of S/Si-compatible EndoWrists and over $3 billion of X/Xi-compatible EndoWrists. As noted above, Keith Johnson of SIS testified in his personal capacity that they thought their company's opportunity alone was "250 to 350 million dollars a year in [gross] revenue."[630]

268. Rivals were foreclosed in several ways, which are detailed below. First, when hospitals defied their restraints to purchase EndoWrist repair services from Rebotix, Restore, and SIS, Intuitive was able to enforce those restraints in a way that drove those hospitals to stop buying such rival repair services. Second, Intuitive foreclosed hospitals that would have used Rebotix, Restore, and/or SIS but for Intuitive's tying and exclusivity restraints. Third, Intuitive excluded potential entrants that simply did not enter in the face of those restraints.

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[628] *Supra* Section III.A.1.

[629] Hamilton (in *In re: da Vinci*) Dep. at 35:12-22 ("Q. Okay. Is Rebotix today repairing EndoWrists? And I'm using the word 'repair' the way you've been using it today. A. Rebotix has the capability to repair them. I don't think there are -- there's any string coming through right now. But again, I -- I don't know that we would turn it away if it came in right now. I'm just not certain. I'm not involved in day-to-day operations. Again, I'm not even in that physical location right now. But if we are, it would be a very, very small amount."); Parker (in *In re: da Vinci*) Dep. at 130:2-20 (Restore hasn't reset use counters for hospitals since 2019 time-frame).

[630] Johnson (in *In re: da Vinci*) Dep. at 17:5-13.

1. Intuitive's Exclusionary Restraints Drove Rebotix, Restore, and SIS Out of Hospitals that Initially Used Them

269. Numerous hospitals for a time defied their restraints and used rival repaired EndoWrists, but Intuitive successfully enforced those restraints to prevent hospitals from continuing to do so.[631] For example, none of Rebotix's previous customers continued to purchase repaired EndoWrists from Rebotix after Intuitive enforced its exclusionary restraints.[632] Similarly, none of SIS and Restore's customers continued to purchase repaired EndoWrists from them after Intuitive enforced its exclusionary restraints.[633]

270. The IRCs uniformly point to Intuitive's actions as the reason they left the marketplace. Glenn Papit, co-founder of Rebotix, testified that Rebotix was "not functional" because the customers they had for EndoWrist repair "received notices from Intuitive that if they used us, they would cancel the service contracts on their robots, which frightened the customers to death."[634] Glenn Papit also testified that customers were "overwhelmingly interested in using Rebotix's EndoWrist repair service, but "[t]he concern from customers was always what Intuitive's response

[631] Papit (in *Rebotix*) 30(b)(6) Dep. at 237:4-17 ("Q And the revenue that it received for those repairs is approximately $542,000; is that correct? A That is correct. Q Okay. Do you consider Rebotix Repair to be a successful business? A To the point where we got it, it was very successful. Q What do you mean by 'to the point where we got it'? A Well, as soon as the OEM recognized what we were doing, they made a very forceful push to stop us, and then that was combined with -- immediately with the pandemic. So those were two limiting factors in our growth.").

[632] Vavoso (in *Rebotix*) 30(b)(6) Dep. at 226:18-22 ("Q. Is there any instance that you can identify, as Intuitive's 30(b)(6) witness, where a hospital continued using Rebotix's services after receiving these letters from Intuitive? A. Not – not at this time.").

[633] Posdal (in *Surgical Instrument*) 30(b)(6) Dep. 22:13-17; Johnson (in *In re: da Vinci*) 30(b)(6) Dep. 42:15-29; Parker (in *Restore*) Dep. at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots.").

[634] Papit (in *Rebotix*) 30(b)(6) Dep. at 37:7-10, 33:7-12 ("Q. Why is Rebotix LLC not functional at the moment? A. The customers that we gained received notices from Intuitive that if they used us, they would cancel the service contracts on their robots, which frightened the customers to death.").

would be and what the contract said."[635] SIS had a similar experience.[636] Kevin May of Restore testified that "Intuitive had stopped us from repairing anything by keeping us out of the market."[637]

271. Hospitals have testified that the reason they stopped using IRC repaired EndoWrists was due to Intuitive's tying and exclusivity restraints. Evergreen's representative testified that they "made the decision to stop using the repair services [of Rebotix] based on communication from Intuitive."[638] Pullman Regional Hospital's representative testified that "[i]f it weren't for Intuitive's contractual limitations" they would have "use[d] Rebotix's services to the full extent that Rebotix was willing to provide them."[639] Tyler McDonald of Conway Regional Medical Center testified that it would have continued using refurbished instruments but for Intuitive's refusal to provide other proprietary instruments and service.[640]

2. Rebotix, Restore, and SIS Were Foreclosed from Hospitals that Would Have Used Them But For Intuitive's Exclusionary Restraints

272. Beyond those who did purchase repaired EndoWrists, there were many hospitals who were potentially interested in using repaired EndoWrists, but who were deterred by Intuitive's restraints. For example, of the customers that Medline pitched on repaired instruments, "only about 5 or 10 percent" had "clinical

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[635] Papit (in *Rebotix*) 30(b)(6) Dep. at 86:21-87:16 ("Q When Rebotix began resetting the usage counters for EndoWrist for its customers, did you receive any feedback from customers? A Yes. Q Were customers interested in using the service? A Overwhelmingly. Q Did you have repeat customers? A Yes. Q How many? A May I look at the document again? Q You may. A Thank you. Just in the first three pages, I have 12. Q Did you ever field any concerns from customers about resetting the usage counter on the EndoWrist? A The concern from customers was always what Intuitive's response would be and what the contract said. I will tell you, frankly, their customers do not like them.").

[636] Posdal (in *Surgical Instrument*) 30(b)(1) Dep. 42:14-43:19.

[637] May (in *In re: da Vinci*) Dep. at 72:14-15. *See also*, Parker (in *In re: da Vinci*) Dep. at 130:10-23 ("Q You have not reset any EndoWrists with Restore technology since that time; correct? A Not for hospitals, just for internal testing purposes. Q Why haven't you reset any EndoWrists for hospitals in that time frame? A It's futile. If we do that, then Intuitive goes to the hospital and threatens to end their contracts, threatens to not sell them instruments, not sell them accessories, threatens to move their doctors to other hospitals, et cetera. Q And you say that because that's what Intuitive has done in the past? A Correct.").

[638] Donovan (in *Rebotix*) Dep. at 54:5-55:24.

[639] Harrich (in *Rebotix*) Dep. at 62:6-10; see also, 69:8-16, 82:2-8.

[640] McDonald (in *Restore*) Dep. at 17:10-19:17 (e.g., "Q: Would Conway still be refurbishing the instruments today if it could do so? A. Yes.").

objections" while the "vast majority" avoided using rival repaired EndoWrists based on Intuitive's contractual restraints.[641]

273. Rebotix, Restore, and SIS had hundreds of hospitals who were interested in purchasing repaired EndoWrists, but Intuitive's restraints stopped them before they could start. Glenn Papit, co-founder of Rebotix, testified that Rebotix had "two contracts in place [Premier GPO and BayCare Health System] that would have led to hundreds of hospitals coming onboard, and all of that was nipped in the bud extremely aggressively" by Intuitive.[642] In particular, Intuitive "tied the purchase of EndoWrists to the service contract for the robot."[643] Bob Overmars of BPI estimated that for over 20 hospitals they pitched EndoWrist to, Intuitive "scared the customer away" by "tell[ing] the customer that they would no longer support their robotics program or maintenance of their EndoWrists or robotic devices if they used a third party for the repair."[644] Greg Posdal of SIS gave examples of customers interested in repaired EndoWrist including a large hospital system (Kaiser), group of hospitals (Advocate Aurora Healthcare, Banner Health, Piedmont Health Systems), and a group purchasing organization (Vizient).[645] Restore was "active" at

[641] Colletti (in *Restore*) Dep. at 10:22-11:7.
[642] Papit (in *Rebotix*) 30(b)(6) Dep. at 238:8-18.
[643] Papit (in *Rebotix*) 30(b)(6) Dep. at 238:19-25
[644] Overmars (in *Rebotix*) Dep. at 116:23-117:16, *see also id. at* 120:21-121:10.
[645] [redacted]

Baylor but Intuitive "had a long conversation with Baylor's counsel" and "[t]hey know ISI will not allow language that will give Baylor permission to extend Instrument uses."[646] Clif Parker of Restore testified, "We have lots of prospective customers that we could sign contracts with, but we have not done so at this point cause it's futile until we get some sort of relief from Intuitive blocking."[647]

274. Clif Parker of Restore described the experience, and how it discouraged Restore's reps and distributors, as follows:

> Q. Was it your experience that reps would come and go? Some would sign on for a while; and then either because they weren't productive or for some other reason, would sort of drop out?
>
> A. Well, the reason we lost reps was due to the actions of Intuitive Surgical, which is the reason we're here today. So they would approach the hospitals. The hospitals would be very excited. Very interested in the program. Want to pursue things. And then they started getting threats and pushback from Intuitive, you know, telling them that they would lose access to service. They would not be able to buy, you know, disposables. They would not be able to buy instruments. They would lose, you know, surgeon training, that sort of thing. So when those things are piled on, that made it very difficult, if not impossible, to continue sales efforts and -- And they would receive threatening letters from Intuitive, both the hospital and sometimes the distributors would receive letters from Intuitive threatening them, and so that caused them to continue to drop off.
>
> Q. Oh. Do you attribute the attrition of all of the reps and all of the distributors who did cease working on the store account to the conduct of Intuitive?
>
> A. At least 99 percent. I haven't looked at each one to see what the reason, but that is by far the overwhelming reason. There may be one or two for some other reason that I don't recall at the time; but by far, almost all of them were because of the actions of Intuitive.[648]

[redacted]

[646] Intuitive-00359647-649 at 648.

[647] Parker (in *In re: da Vinci*) Dep. at 139:23-140:4. *See also*, *id*. at 140:5-8 ("Q What makes you think you could sign contracts with those customers if it weren't futile? A They've told us they would sign contracts with us tomorrow and do business with us tomorrow.").

[648] Parker (in *Restore*) 30(b)(6) Dep. at 106:9–107:19.

275. Beyond just foreclosing rivals selling S/Si-compatible EndoWrist repair, Intuitive's restraints also foreclosed rivals from providing X/Xi-compatible EndoWrist repair. Although these rivals have not yet brought X/Xi-compatible EndoWrist repair to market, this was because they had seen how Intuitive had foreclosed the market.[649] Rebotix's efforts to reset the use counter in X/Xi-compatible EndoWrists started in late 2014 but were paused in 2015.[650] Rebotix subsequently restarted these efforts and found a way to reset the use counter recently.[651] Clif Parker of Restore is "a hundred percent" confident that they will be able to come up with the technology to bypass the X and Xi chip.[652]

276. Experience repairing S/Si-compatible EndoWrists was relevant to getting into the X/Xi-compatible business because physically much of the EndoWrists are the same. For a given model (e.g., a particular type of forceps or scissors) the lower 7/8th, including the portion which is inserted into the patient, was the same for the X/Xi-compatible EndoWrists as the corresponding S/Si-compatible EndoWrists.[653] Stan Hamilton of Rebotix testified that "[m]uch of the equipment" for repairing X and Xi EndoWrists "is common to S and S[i]" EndoWrist repair.[654]

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[649] *See*, e.g., *Rebotix Repair LLC vs. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274, Declaration of Glenn Papit, December 8, 2021, at ¶ 9 ("Rebotix determined not to invest the resources to finalize a reset to the X/Xi usage counter because doing so would be futile in the face of Intuitive's reaction to hospitals using Rebotix's services."); Mills (in *Rebotix*) Dep. at 38:19-39:2, 97:1-9.

[650] Rebotix worked with G-5 to reset the use counter on the Si-compatible EndoWrists, and Rebotix produced a "G-5 Engineering Timeline" in which G-5 proposed evaluating the Xi EndoWrist in 11/2014, began analyzing the use counter chip in early 2015, and was told to hold off in April 2015 (REBOTIX110980-981 at 981); REBOTIX171289-314 at 292 ("G5 worked with Rebotix to come up with a way to legally bypass the verification method provided on the Da Vinci SI Surgical System."); REBOTIX004895-911.

[651] Hamilton (in *In re: da Vinci*) Dep. at 42:1-11 ("So from a technical perspective today – as of today, Rebotix has figured out how to reset the usage counter for Xi instruments. Is that what you're saying? [...] THE WITNESS: I agree. Yes.").

[652] Parker (in *In re: da Vinci*) Dep. at 141:14-21. *See also*, May (in *In re: da Vinci*) Dep. at 97:5-8 ("Q. How confident can you – are you that Restore will be able to develop the technology to repair X- and Xi-compatible EndoWrists? A. Extremely high.").

[653] Parker (in *In re: da Vinci*) Dep. at 132:24-133:25. *See also*, May (in *In re: da Vinci*) Dep. at 87:8-18 ("Q. Is the tip effector the part that actually goes into the patient? A. That's correct. Q. And is it your testimony that the tip effector for the X and Xi are the same for substantially similar to the Si EndoWrists? A. Yes, absolutely. And – and the FDA has said that it's substantially equivalent. So the FDA has said that – that the Xi and the X – X and Xi instruments are substantially equivalent to the S and the Xi [verbatim].").

[654] Hamilton (in *In re: da Vinci*) Dep. at 12:14-22. *See also, id*. at 17:1-11 ("Q. Earlier, I asked you about the equipment that you may have purchased to get into the business of repairing Xi

3. Potential Entrants to Third-Party EndoWrist Repair Were Foreclosed Due to Intuitive's Exclusionary Restraints

277. There are many third-party medical device repair companies generally, showing that ISO repairs are a thriving part of the medical device sector. Intuitive's own market analysis identified multiple "key players."[655] Many additional companies beyond Rebotix, Restore, and SIS would have had the connections and general expertise to enter the EndoWrist repair market if it were not foreclosed, as described below.

278. As an initial matter, in the absence of Intuitive's exclusionary conduct there would have been a profit motive to enter this market. Intuitive was earning high margins selling EndoWrist replacements (see Section II.E.2 above), and economic theory predicts that high margins generally induce entry. [656]

279. Stryker is an example of a potential entrant that was foreclosed due to Intuitive's exclusionary restraints. In December 2015, Stryker signed a proposal enter the market by acquiring Rebotix's S/SI EndoWrist assets "for a total potential consideration of US $13.5 million."[657] Stryker was and is a large competitor in aftermarkets for medical devices and instruments.[658] However, by March 2016

EndoWrists. What about facilities? What facilities does Rebotix have for repairing X and Xi EndoWrists? A. Currently, the facility in Florida, which was used to – to do the Si instruments is capable of also doing Xi instruments. It still exists. The bulkier equipment that I discussed earlier, things like sterilization stations and fixtures for testing and that kind of thing, those still exist.").

[655] Scoville (in *Restore*) Dep., Exhibit 2 at Intuitive-00224006 (Stryker Solutions, IMS Ready – Steris, Stryker Sustainability, SterilMed – J&J, Medline, Aesculap, SpecialtyCare, Northfield – Formerly Prezio Health, Steris Mobile Solutions).

[656] PINDYCK & RUBINFELD, MICROECONOMICS 377 (8th ed. 2013) ("Large short-run profits can induce new firms to enter an industry"); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 116 (4th ed. 2005) ("In most markets, positive economic profits would attract new entrants.").

[657] Mixner (in *Rebotix*) Dep. Ex. 15 at REBOTIX139042 and at 74:22-25 ("Q Did Stryker make an offer to buy something? MR. ERWIG: Objection, form. THE WITNESS: They made a verbal offer to buy something, yes."). See also, Gibson (Rebotix) Dep. at 101:10-21 ("Q What happened with regard to Stryker after that meeting? A They took some time, and I – I assume they discussed the project internally. And they got back to us and said they would like to do some due diligence…. And then eventually, they brought a team in to perform due diligence on our service process. Q When you say they brought a team in, what – where did that team come? A To our office in St. Petersburg, Florida.").

[658] For example, Stryker's "single-use medical device reprocessing and remanufacturing services produced a record-setting $255 million in supply cost savings for its more than 2,500 hospital and

Stryker's due diligence investigation turned up issues including Intuitive's "purchase agreements and service contracts" and "ability to affect customer's service contracts", which caused them to back out of the project.[659]

280. At least three additional competitors—Steris, Revanix, and Medline—were exploring the possibility of repairing EndoWrists, but neither ended up entering the market. David Mixner, president and sole owner of Rebotix in 2014/2015, testified that Steris approached Rebotix about acquiring EndoWrist repair technology between 2013 and 2014.[660] Revanix Biomedical was, in 2019, asking Larkin Hospital for used EndoWrists so that Revanix could show Larkin what a reset would be like.[661] Clif Parker of Restore testified that "Medline, I know they intended to enter the market through us."[662] I have seen no evidence that any of these firms ended up entering the market.

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health system customers in 2013." PRNewswire, March 31, 2014, https://www.prnewswire.com/news-releases/stryker-sustainability-solutions-brings-record-setting-255-million-in-reprocessing-savings-to-us-hospitals-253178411.html (accessed 11/18/2022). Stryker's Sustainability Solutions business unit describes itself as "the leading provider of reprocessing and remanufacturing of single-use medical devices." Stryker, https://sustainability.stryker.com/ (accessed 11/30/2022).

[659] STRREB00000259 ("Attached is the due diligence presentation highlighting the rationale for not going forward with project Raptor. In summary, the risks associated with pursuing this project are too high relative to the potential reward. OEM's ability to affect customer's service contracts, capital purchases and disposal rebates would drive savings from SSS [Stryker Sustainability Solutions] to unacceptable levels. OEM purchase agreements and service contracts are proprietary with no 3rd party options. Updated valuation model (ASP decline, product development and GQO expenses increased) created a negative NPV."); STREB00000260-273 at 271 ("Project Raptor Summary…Key risk factors 1) OEM response and revenue continuity (IP, design change, capital/service contract, void capital warranty, clinical support) 2) Surgeon and hospital relationships with OEM (acceptance of reprocessed devices) 3) Ability to obtain US regulatory clearance").

[660] Mixner (in *Rebotix*) Dep. at 78:5-11 ("Q…Were you president of Rebotix in 2014/2015? MR. ERWIG: Object to form. THE WINTESS: Yes. Q (By Mr. Ruby) And you were the sole owner; is that right? A Yes, sir."); *id*. 49:15-50:12 ("Q Did you ask Mr. Papit to inform you if he had any discussions with anyone about acquisition of the interceptor chip? A I did. He came to me and said that Steris…knew of our technology, and they reached out to us about meeting with them about the possible purchase or acquisition of this technology. Q Approximately when was that? A 2014. I cannot be sure. I would say between 2013 and 2014. Q Did Steris ever offer to buy the interceptor technology from you? A They had a -- I do believe there was a verbal offer. I did not see anything in written form, from what I remember, but they were extremely interested in purchasing the technology, yes. Q And how much did they offer verbally? A I do believe it was around $50 million.").

[661] LARKIN-00000061-062 at 061.

[662] Parker (in *In re: da Vinci*) Dep. at 153:4-11.

C. Intuitive's Tying and Exclusivity Restraints Were a Substantial Cause of Hospitals' Failure to Use Third-Party EndoWrist Repairs

281. The evidence above in Section IV.B shows that Intuitive's conduct directly (causally) led to rivals being excluded.[663] Intuitive may argue that there were instead *other* reasons that third-party EndoWrist repair businesses (including Rebotix, Restore, SIS, and potential entrants) would have failed in the but-for world, even absent Intuitive's use of tying and exclusionary restraints. For example, Intuitive may argue that the rivals would have faced (1) regulatory hurdles (like 510(k) clearance); (2) practical hurdles (like convincing customers of safety and efficacy, especially in light of Intuitive's threats and misinformation); or (3) capacity constraints. Here, I show that no such reasons were significant factors (if factors at all) in the exclusion of these rivals.

1. The Alleged Need for FDA Clearance Did Not Cause the Exclusion of Third-Party EndoWrist Repair Rivals

282. The alleged need for FDA clearance did not cause the exclusion of third-party EndoWrist repair rivals. This is a logical conclusion based on the evidence that (i) FDA clearance may not have been necessary in the first place, (ii) even if FDA clearance were ultimately found to be necessary, IRCs would have continued operating until such a finding was made, (iii) one IRC has already obtained FDA clearance, and (iv) if FDA clearance were ultimately found to be necessary, IRCs could have obtained it in the but-for world, and (v) the FDA clearance issue bears little relationship to the pattern of exclusion.

i. FDA Clearance May Not Have Been Necessary in the First Place

283. It is my understanding that the FDA does not require 510(k) clearance for every change or update to an existing product.[664] As noted above, there is evidence that 510(k) clearance is not required if the repairer either does not take ownership over the device or does not make significant changes to its performance, safety, or intended use.[665] Glenn Posdal of SIS indicated that it was not typical to get 510(k) clearance for device repairs.[666] Further, there is evidence that 510(k)

[663] One can also infer such causality from the combination of evidence on total market foreclosure (see Part IV.B above) and evidence of anticompetitive effects (see Part V below).
[664] Trautman Report, § IV.B. *See also supra* Section I.C.2.
[665] *See supra* Section I.C.2; Trautman Report ¶¶ 19, 29, 35.
[666] Posdal (in *Restore*) Dep. at 11:5-7.

clearance was not necessary for EndoWrist repair in particular.[667] Intuitive's own Project Dragon analysis of EndoWrist repair concluded that 510(k) clearance was not necessary.[668] Likewise, Intuitive concluded that its extended use program did not require clearance because increase the use limit did not change the intended use or constitute a significant change.[669] Clif Parker, CEO of Restore, testified, "Restore does not believe that 510(k) clearance is necessary to repair a hospital's EndoWrists or reset the usage counter on a hospital's EndoWrist. Kevin May has performed the analysis to make that determination," though to be cautious Restore nonetheless sponsored a 510(k) application.[670] Finally, a "Joint Letter re: Discovery Dispute to Judge Beeler from Intuitive Surgical, Inc. and Alliance Healthcare Partners, LLC" states that the FDA "has never issued a warning letter or taken enforcement action against any company for extending the EndoWrist usage limits without a 510(k). Most recently, Intuitive itself sold extended use instruments for nearly two years before receiving a 510(k)."[671]

284. Even though the FDA was contacted no later than mid-2018 about whether EndoWrist repair required 510(k) clearance,[672] as of July 15, 2022, the FDA

[667] Trautman Report ¶¶ 30-31, 35, 82.

[668] Intuitive-00367019-063 at -059 ("Clearance/registration required? No"). *See also* Intuitive-00955999-6006 at 6006 (no 510(k) clearance was required for Intuitive to offer extended-use versions of several EndoWrists).

[669] Trautman Report ¶¶ 68-70 (collecting Intuitive documents).

[670] Parker Declaration at ¶ 8; *see also*, *id.* at ¶ 6 (Nevertheless, "Restore has sponsored a 510(k) premarket submission for the marketing and sale of reprocessed Si EndoWrists through Iconocare. The clearance is pending with the FDA."). *See also*, May Dep. at 80:1-14 ("Q. And what do you base that belief [that no 510(k) clearance is required] on? A. The repair aspect is very defined. And it has [sic] do with ownership of the device. So the device, if it's owned by the hospital, if it comes to use as a third party and the hospital creates a PO and requests us to repair the device, we repair the device and return it back to the hospital. We do not – there's no change of ownership, so there's no labeling requirements, there's no remanufacturing requirements as of today. And so, we could go through and repair all of the instruments without having any – any requirements of – to get a 510(k) for the repair process, where we did not take ownership.").

[671] Joint Letter re: Discovery Dispute to Judge Beeler from Intuitive Surgical, Inc. and Alliance Healthcare Partners, LLC, November 17, 2022 (ECF No. 106), at p. 4.

[672] *Rebotix Repair LLC v. Intuitive Surgical, Inc., 8:20-cv-2274-VMC-TGW*, Intuitive Surgical Inc.'s Dispositive Motion for Summary Judgment, 11/17/2021, at ¶ 45 ("In May 2018, BPI reached out to Dr. Cal Rabang at FDA to inquire whether 510(k) clearance was needed for EndoWrist 'repairs.'") and Exhibit 41 [BPI000331-337]. *See also*, Papit (in *Rebotix*) 30(b)(6) Dep. at 223:18-224:6 (indication in 2019 that 510(k) clearance not required).

still did not have a "formal position" on the matter.[673] This is consistent with the experience of SIS, whose witness indicated that device repair is an area the FDA has largely left untouched.[674] Likewise, Deutsche Bank in 2020 concluded, "FDA action to stymie usage of repaired instruments is highly unlikely."[675] I also understand that plaintiff expert Ms. Kimberly Trautman will opine that there was no FDA bar to entry for third party IRCs.[676] As discussed in the next section, rivals would therefore have entered the market until the FDA took regulatory action to prevent them from operating.

ii. Even if FDA Clearance Were Eventually Found Necessary to Repair, Rivals Would Likely Have Operated in the But-For World Until Such a Finding Was Made

285. It is my understanding that repair companies typically operate in medical device markets like this until the FDA provides a formal indication that 510(k) clearance is required.[677] This is how Intuitive approached modifications to the use limits it placed on EndoWrists. Intuitive started selling extended-use EndoWrists without applying for 510(k) clearance.[678] Intuitive later decided to apply for 510(k) clearance for the extended-use EndoWrists but kept marketing them in the meantime.[679]

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[673] Notice re clarification by the FDA, ECF No. 180, July 25, 2022 in *Rebotix Repair LLC vs. Intuitive Surgical, Inc.,* Case No. 8:20-cv-02274. This clarifies an earlier statement by Dr. Lee in which he indicated the FDA had made a "decision."

[674] Posdal (in *Restore*) Deposition at 11:11-18.

[675] DeSantis (in *Rebotix*) Dep. Ex. 11 at Intuitive-00566057; *see also,* Intuitive-00566055-082 at 057, 065 (Intuitive acknowledges that regulatory enforcement actions of third party service providers broadly are unlikely, noting in a written correspondence to a hospital customer that FDA will likely `exercise a certain degree of enforcement discretion from FDA quality system requirements as they apply to third party service providers and refurbishers."). *See also*, Intuitive-00552993-53014 at 52997-998.

[676] Trautman Report ¶83.

[677] Trautman Report, § VI.

[678] Lowe Dep. at 33:22-34:5 ("Q. As part of the Extended Use Program, Intuitive issued nonfiling justifications that extended the number of lives for certain EndoWrists; is that right? A. Yes. Q. Intuitive began marketing those extended use EndoWrists after those nonfiling justifications were filed? A. Yes."). *Id*. at 17:5-15 ("Q. Mr. Lowe, what has been previously marked as Plaintiffs' Exhibit 81 is a nonfiling justification; is that right? A. Yes. Q. And these documents are sometimes referred to as NFJs; correct? A. Yes. Q. This document is intended to justify Intuitive's decision not to seek 510(k) clearance; is that right?"); Trautman Report ¶¶ 72-73.

[679] Lowe Dep. at 34:21-35:10 ("Q…In December of 2021, Intuitive filed an application for 510(k) clearance for extended use EndoWrists; is that right? A. Yes. Q. The FDA granted that

286. Operating until the FDA provides a formal indication that 510(k) clearance is required is exactly what was happening until Intuitive's challenged conduct excluded third parties from repairing EndoWrists. None of the third-party IRCs had 510(k) clearance at the time that they were selling repaired EndoWrists.[680] Operating in such a market before obtaining FDA clearance is economically rational if the costs and delayed profits associated with applying for clearance outweigh a perceived low risk that such clearance might later be deemed necessary, multiplied by any penalties for not obtaining it. The fact that several firms did so indicates that they thought this was the case. Without the challenged restraints, the profits from entry would have been greater, and thus more firms would have likely reached the same conclusion.

iii. Even if FDA Clearance Were Found Necessary to Repair, One Rival Has Already Obtained It

287. Even if the FDA does ultimately require 510(k) clearance to repair EndoWrists, Restore in September 2022 obtained clearance for its own (non-Rebotix) repair procedure for S- and Si-compatible EndoWrists.[681] This was done in spite of the fact that Restore "does not believe that 510(k) clearance is

application in August of 2022; correct? A. Yes. Q. Between December of 2021 and August 2022, Intuitive marketed extended use EndoWrists; correct? A. Yes. Q. Is it Intuitive's position that marketing extended use EndoWrists prior to August of 2022 was unlawful? A. No."). *See also*, Intuitive-02038766-770 at 766 ("This is the explanation she gave me: 'We already when from 5 lives in the 510(k) to 10 lives when we started shipping on an NFJ.").

[680] The only third-party IRC to receive 510(k) clearance for repaired EndoWrists was Restore, and it did not receive clearance until September 2022 after had stopped selling. *Supra* Section IV.C.1.iii and Table 2.

[681] Letter from U.S. FDA to Rick Ferreira at Iconocare Health Re: K210479 dated 11/15/2022, available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf (with attached FDA letter dated 9/30/2022 indicating "We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce….You may, therefore, market the device, subject to the general controls provisions of the Act."); May Dep. at 79:20-22 ("Q. Does Restore currently have the 510(k) – 510(k) clearance for EndoWrist remanufacturing? A. We have 510(k) for the 420179 EndoWrist."); *id*. at 86:2-11 ("THE WINTESS: Yes. But also, we believe that you don't have to get a 510(k) on some of the other devices. So in the past, we have – we have done what's called a 'family' or 'expansion of the family.' And so, you have – you have a 510(k) for the most difficult device. And then you do what's called a 'letter to file.' And you – you're able to do the remanufacturing or the manufacturing on these similar or equivalent devices without going through the 510(k) process.").

necessary."[682] The existence of a competitor with 510(k) clearance who remains currently excluded from the market indicates that 510(k) clearance was not the factor excluding them from the market. Restore's ability to obtain 510(k) clearance for setting EndoWrist counters also indicates that such clearance could technically be obtained, and thus that if potential entrants in the but-for world had greater incentives to obtain such clearance, more of them could have done so and they could have sought such clearances earlier.

iv. Even If FDA Clearance Were Found To Be Necessary, in the But-For Word, More Entrants Would Have Had Incentives to Obtain Clearances Earlier

288. Intuitive's exclusionary restraints suppressed potential entrants' economic incentives to pursue 510(k) clearances. This is because Intuitive's exclusionary restraints so thoroughly foreclosed the market that the potential profits that an entrant could make were greatly reduced, which lowered the economic value of getting a 510(k) clearance without reducing the cost of obtaining it. For example, Clif Parker of Restore testified that "we anticipated having or utilizing funds from the repair business to – to fund the 510K, so with Intuitive's actions blocking our sales efforts, that greatly limited our ability to generate revenue from the repair business."[683] In the but-for world, more potential entrants would have had economic incentives to pursue 510(k) clearances, and they and Restore would have economic incentives to seek such clearances earlier.

v. FDA Clearance Issue Bears Little Relationship to the Pattern of Exclusion

289. Ultimately, the issue of FDA clearance bears little relationship to rival exclusion for two reasons. First, firms in fact entered the market without such clearance and were driven out of the market by Intuitive's exclusionary rather than by their lack of clearance.[684] Second, the firm that obtained such clearance remains

[682] Parker Declaration at ¶ 8. *See also*, Parker (in *In re: da Vinci*) Dep. at 148:8-15 ("THE WITNESS: Restore does not believe you need a 510K to do a repair."); May (in *In re: Da Vinci*) Dep. at 82:4-16 (Q. …If Restore does not need 510(k) clearance to repair EndoWrists, why did it apply for it? A. So the reason Restore applied for a 510(k) is because we own a significant amount of Si instruments, and they were just sitting in storage. And we wanted to be able to take those instruments that are in our inventory and to be able to reset them and then sell them to the hospitals. We also wanted to be able to purchase more instruments from hospitals or auctions or other vendors and take those – take ownership of those devices and then to turn around and resell them.").

[683] Parker (in *In re: Da Vinci*) Dep. at 129:18-25.

[684] *See supra* Section IV.C.1.ii.

foreclosed from the market by Intuitive's exclusionary restraints.[685] Therefore, FDA clearance issues cannot provide a good alternative explanation for the exclusion pattern that we see. Instead, the pattern we see is that firms entered without FDA clearance, and the exclusionary restraints are what limited their sales and ultimately drove them out of the market, and the one firm to get FDA clearance remains foreclosed from the market by the exclusionary restraints despite that clearance.

2. Hospital Perceptions About Repaired EndoWrists Did Not Cause the Exclusion of Third-Party Repair Companies

290. Hospital perceptions about repaired EndoWrists did not cause the exclusion of third-party repair companies. Even Intuitive's internal analysis showed that repaired EndoWrists could be as good as new.[686] In light of this, the exclusion of third-party EndoWrist repair companies was not caused by (i) perceptions about FDA clearance or (ii) perceptions about safety.

i. Perceptions About FDA Clearance

291. In Section IV.C.1 above, I explained that the potential or actual need for FDA clearance would not have resulted in the exclusion of third-party repair companies for regulatory reasons. Here, I note a related but distinct point: that *hospital perceptions* about FDA clearance would not have resulted in the exclusion of third-party repair companies. Put differently, the question here is how any uncertainty around the need for FDA clearance might have affected hospitals' receptiveness to using repair services; the answer is that any such uncertainty would not have excluded third-party repair companies.

292. Evidence suggests that perceptions about FDA clearance could not have been the primary reason that EndoWrist repairs were excluded from the market. As an initial matter, many observers did not believe FDA clearance was required.[687] Some of the hospitals voted with their feet, purchasing EndoWrist repair from IRCs even without FDA clearance.[688] As described in the immediately following section, at least some hospitals did not have safety or quality concerns about EndoWrists repaired by Rebotix, Restore, or SIS.

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[685] *See supra* Section IV.C.1.iii.
[686] Intuitive-00103456 at -459 ("Refurb instruments will be equally capable to new.").
[687] *See Supra* Section IV.C.1.i.
[688] *Supra* Section IV.B.1.

293. To be sure, I do not claim that no hospital ever had any concerns about FDA clearance.[689] Rather, I conclude that the evidence does not indicate that such concerns were a driving force behind the rival exclusion.

ii. Perceptions About Safety

294. As a general matter, there was not a significant concern about the ability of IRCs to safely repair medical devices. As a Deutsche Bank noted, "these devices are typically reparable up to four times. Third party servicing of medical devices has been ongoing for decades, and FDA's comfort around this practice regarding patient safety is quite clear."[690] Ultimately, the fact that third-party repair and service is a multi-billion-dollar industry shows that hospitals are generally comfortable with third-party repairs.

295. The experience of hospitals with traditional laparoscopic instruments suggests that there were no negative perceptions about repairing them. Hospital representatives have testified that it was "standard procedure" to repair and reuse traditional laparoscopic devices.[691] One hospital's representative noted that the attitude of their surgeons "has always been if the instrument works, we'll use it."[692] After all, surgeons and hospitals also have some ability to determine whether an instrument is safe for use.[693] Dr. Eugene Rubach's expert report indicates that

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[689] *See*, e.g., Parker (in *In re: da Vinci*) Dep. at 148:23-149:1 ("And some hospital systems will not do any business with someone that doesn't have a 510K, so as a small percentage, five or 10 percent of the hospitals out there…").

[690] Intuitive-00552993-3014 at 2993.

[691] Harrich (in *Rebotix*) Dep. at 33:13-34:7 (In the region around Lewiston-Clarkston, it is "standard procedure to repair and reuse traditional laparoscopic devices that are similar to the EndoWrist used in da Vinci surgeries."); Donovan (in *Rebotix*) Dep. at 29:20-30:6 (It was "standard procedure at Evergreen to repair reusable instruments used in traditional nonrobotic surgeries" and deponent was "not aware of any" hospitals that wouldn't repair reusable, traditional laparoscopic instruments as needed.).

[692] Madewell (in *Restore*) Dep. at 24. As another example, Ricardo Estape, director for HCA Florida's Institute for Gynecologic Oncology, testified that he has had EndoWrists fail "50 times or so" during surgery and when that has happened to him there have been no deaths or catastrophic events and "I just tell them to change out the instrument." Estape (in *In re: da Vinci*) Dep. at 7:24-8:1, 69:1-20.

[693] Dickens (in *Restore*) Dep. at 30:13-31:21 ("THE WITNESS: I would love to be able to use and instrument until it is no longer useful as determined by me…" "And so as surgeons, we understand using our equipment as long as is possible to provide safe, effective care"); Harrich (in *Rebotix*) Dep. at 40:12-25 ("Q. What process does your hospital undertake to inspect an EndoWrist from Intuitive before it's used in a surgery? A. So the inspection process will start in central sterile

surgeons use instruments in such a way as to safeguard against patient injury even if an instrument were to fail.[694]

296. Consistent with this, evidence from hospitals, surgeons, and other market participants indicates there was not a significant concern about the ability of IRCs to safely repair EndoWrists.[695] For example, Conway Regional Medical Center "performed a trial of the refurbished instruments," surgeons were "eager to try the instruments," after trying them surgeons "reported back to me that they were collectively in agreement to move forward with using the refurbished instruments."[696] Pullman Regional Hospital's representative testified that their surgeons, first assists, scrub assists were not "able to discern any difference between those EndoWrists and EndoWrists that had not been repaired or serviced by Rebotix."[697] Ardent Health's representative testified that she "consulted with clinical people about the patient safety for the refurbished instruments" and was indicated that there were "no issues" about patient safety on refurbished EndoWrist instruments."[698] Greg Posdal of SIS testified that he had no "reason to think that hospitals have expressed to SIS safety concerns with respect to repaired EndoWrists."[699] Keith Johnson of SIS testified that Mayo Clinic was one of the "most renowned teaching, quality of care, standard of care organizations in the U.S.," and it was interested in EndoWrist repair.[700] A Deutsche Bank analyst report indicated that there was "[n]o evidence that repaired da Vinci instruments specifically pose a risk to patient safety – in fact, au contraire…"[701]

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processing. There is [sic] multiple steps on processing and packaging those instrumentations, protecting the tips on them. Once they're packaged, sent through sterile processing, they come into the room. The scrub tech, when they open the trays, will examine them on the field, make sure that the jaws are open and close, that the – you know, everything is clean, that there is no dried blood, that the ports are working. And then the first assist will do that also.").

[694] Rubach Report ¶ 11 and § V.

[695] A letter sent from Myriam Curet to Dr. William Maisel at the FDA contained statements about Rebotix safety which Myriam Curet later clarified had no basis. *See* Curet (in Rebotix) Dep. at 114:7-14, 142:12-143:14, 151:15-20, 153:17-154:3, 164:12-18.

[696] McDonald (in *Restore*) Dep. at 14:11-24, 15:15-19, 13:20-17:25, 67:22-68:15.

[697] Harrich (in *Rebotix*) Dep. at 38:9-39:3.

[698] Wasfy (in *Restore*) Dep. at 44:4-7, 111:21-112:15.

[699] Posdal (in *Surgical Instrument*) 30(b)(1) Dep. at 82:14-18.

[700] Johnson (in *In re: da Vinci*) Dep. at 56:10-22.

[701] Intuitive-00552993-3014 at 2998 (emphasis omitted).

297. Intuitive's own analysis noted that refurbished instruments can be "equally capable to new."[702] Further, Intuitive's own da Vinci robot sales contract provided that when replacing robot parts, it could use "reconditioned parts."[703] Pullman Regional Hospital's experience was that they rejected some replacement EndoWrists from Intuitive, but had never rejected any that had been serviced by Rebotix.[704]

298. Intuitive's own analysis demonstrates the many steps that Rebotix has taken to allow hospitals to evaluate, and have confidence in, the quality of repaired EndoWrists. For example, Rebotix had multiple certifications for its repair process such as ISO 10993, 13485, 9001, 9002, and 9003.[705] Intuitive has stated that Rebotix's processes "were chosen to comply [with] all of the regulatory and safety standards expected original equipment design" and that the testing showing this "was successful" and the results were available "for hospital audit."[706] Rebotix even had potential customers tour its physical site to evaluate "exactly the mechanisms they would do in order to repair an EndoWrist."[707]

299. Hospital attitudes towards repaired EndoWrist safety are consistent with the FDA's own adverse events reporting database. A January 2020 Deutsche Bank report indicated there have been no adverse events for EndoWrists repaired by Restore or Rebotix that were reported by the FDA.[708] For comparison, during the period from the first U.S. sale of a repaired EndoWrist in July 2018 to the Deutsche

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[702] Intuitive-00104183-205 at 193. *See also* Intuitive-00103456-478 at 459, 466 (it was possible for repaired/refurbished instruments to be "equally capable to new"; "Confirmed clinical utility [of re-manufactured RMA units] was equivalent or better than new instruments.").

[703] Intuitive-01846020-034, at 021 (§5.1). *See also*, with reference to "reconditioned parts," Intuitive-00299311-326 at 312; Intuitive-00005135-147 at 136; Intuitive-00204014-025 at 015; Intuitive-01989020-038 at 027.

[704] Harrich (in *Rebotix*) Dep. at 42:6-43:19.

[705] Intuitive-02068246-297 at 294-295.

[706] Intuitive-02068246-297 at 295.

[707] Colletti (in *Restore*) Dep. at 9:5-10.

[708] Intuitive-00552993 at 2998 (1/27/2020 Deutsche Bank report: "No evidence that repaired da Vinci instruments specifically pose a risk to patient safety – in fact, au contraire….Additionally, clinicians have experienced no known safety issues, with zero MDRs documented in the FDA's MAUDE database from the thousands of repaired instruments that have been used to date."). *See also*, May (in *In re: da Vinci*) Dep. at 107:5-12 ("Q. For the EndoWrists Restore has repaired to date, has it ever been notified by the FDA of a report submitted to the MAUDE database? […] THE WITNESS: No, there has not been. And we have not – and – and as the repair facility, we haven't registered any complaints, either, any MAUDE database complaints, either.").

Bank report in January 2020, Intuitive's OEM instruments and accessories had over a hundred reports of adverse events involving injury or death in the U.S.[709]

300. To be sure, I do not claim that no hospital ever had any safety concern. Rather, I show that there is little reason to believe that such safety concerns were a driving force behind the rival exclusion. After all, only 5 to 10 percent of hospitals pitched by Medline had clinical objections about EndoWrist repairs, while the "vast majority" declined because of contracts and interference from Intuitive.[710]

3. Capacity Constraints Did Not Exclude Rivals from Repairing EndoWrists

301. Capacity constraints did not exclude third parties from repairing EndoWrists. As an initial matter, both Restore and Rebotix were sufficiently capitalized to continue operations. Kevin May, part owner of Restore, testified that Restore "had adequate capital to run a viable business."[711] Consistent with Restore having adequate capital, they were able to rent warehouse space to be ready for expected business.[712]

302. I am unaware of any technical or operational constraints that would have prevented Restore and Rebotix from continuing to operate absent the foreclosure. For example, Restore had "its own large inventory of used Si

[709] Intuitive-00695006.
[710] Colletti (in *Restore*) Dep. at 10:2-12:22.
[711] May (in *Restore*) Dep. at 13:17-14:4, 157:25-158:2.
[712] Parker (in *Restore*) Dep. at 60:12-19 ("Q. When restore Robotics began installing the interceptor technology, where were those installations done? A. Well, they were technically done through Restore Robotics Repairs. Restore Robotics Repairs did the instrument repair, and there was a joint facility, so Restore Robotics Repairs rented an office suite and – and a warehouse."); Parker Dep. at 138:10-13 ("Q Did you secure any additional facilities or space in order to repair X and Xi EndoWrists? A We did. We bought a building in Las Vegas.").

EndoWrists"[713] and "access to qualified facilities and technicians."[714] Imron Zafar, who had analyzed the medical device industry for 12-17 years, agreed that it was reasonable to assume "that Restore could scale its output and expand it fairly quickly."[715] Glenn Papit, co-founder of Rebotix, testified that if Rebotix got EndoWrists to repair "tomorrow, we have the capability of servicing them."[716] Stan Hamilton of Rebotix testified that he "did not recall anything significant that would limit the ability to ramp it [EndoWrist repair business] up. Ramping it up was clearly the plan all along, to ramp it up as quickly as possible, to scale it. The process was designed to be scalable."[717] SIS was "[a]bsolutely" "prepared to scale up its EndoWrist repair business;" SIS had "set aside some room," "started purchasing equipment," and "had the expertise in-house to take care of all of the testing."[718]

303. In addition to Restore and Rebotix, there was also capacity from potential entrants like Stryker. Stryker, which Intuitive flagged as exploring the market and who signed a proposal in 2015 to acquire Rebotix's EndoWrist repair business,[719] has been a "trusted supplier of choice for roughly 3,000 U.S.

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[713] Parker Declaration ¶ 7. As further evidence of used EndoWrist capacity, note that EndoWrists can potentially be repaired multiple times. *See* Mills Vautrot 5/11/2021 Dep. (Restore), *Restore Robotics LLC, et al. v. Intuitive Surgical, Inc.*, No. 5:19-cv-55 (N.D. Fla.), at 156:23-157:18; Vautrot (in *Restore*) Ex. 4 at Restore-00039125 ("How many times can a device be repaired? A conservative estimate is 6-8 times before it would fail testing. However, the device is well designed and there is no reason to think that it could not go longer."); Vautrot (in *Restore*) Dep. Ex. 12 at 1; May (in *Restore*) Dep. at 292:11-21 ("A. I didn't have any problems telling a customer that I felt comfortable with the data we had to do up to five resets. Q. Did you – A. Four or five resets.").

[714] Parker Declaration ¶4. Restore was using MedVision labor and facilities. May (in *Restore*) Dep. at 22:8-22:21, 105:7-105:15. *See also*, *id.* at 104:2-104:22 ("Q. When Restore was conducting EndoWrist repairs in 2019, were there any capacity constraints to how much business it was able to handle? []THE WITNESS: The – the capacity constraints would only be in a ramp-up process. So it would be something that would have to ramp up on a week-by-week basis. But there were no constraints as far as how much we would be able to do because these repairs were simple and they were set up with distinct procedures that can be trained – a – a general assembly person can be trained to do. And the training is only a few days of training."); *id*. at 105:3-12 ("You're talking weeks and months to scale up, depend on what the sales volume was coming in.").

[715] Zafar (in *In re: da Vinci*) Dep. at 21:18-22:19 (15-20 years as an equity analyst, of which all but 3 was researching the medical device industry), 282:9-16.

[716] Papit (in *Rebotix*) 30(b)(6) Dep. at 37:7-10, 33:17-23.

[717] Hamilton (in *Rebotix*) Dep. at 19:16-21.

[718] Posdal (in *Surgical Instrument*) 30(b)(1) Dep. at 86:9-87:4.

[719] Intuitive-02068246-297 at 260; Mixner (in *Rebotix*) Dep. Ex. 15 at REBOTIX139042.

hospitals."[720] Rebotix's openness to licensing (as it did with Restore) or selling to a larger company (as it was poised to do with Stryker) would have eased the ability to take advantage of the capacity at these other firms.[721]

D. The Foreclosure of Rival EndoWrist Repair Firms Began Before the Class Period Started in May 2017

304. By the start of the Class Period in May 2017, Intuitive's foreclosure of rival EndoWrist repair firms had already begun. By 2016, Intuitive was aware that Rebotix had developed and was marketing a method to repair EndoWrists.[722] Also, by 2016, major customers, such as Hospital Corporation of America (HCA), were actively looking at refurbished EndoWrist instruments.[723] As a result, by 2016, Intuitive was already threatening customers over their use of EndoWrists repaired by third parties.[724] In January 2017, Intuitive had already noted about EndoWrist refurbishment that "[t]hird party activity is seen in…US with some in depth trials/conversations occurring" and "[t]here is broad interest in an ISI [Intuitive] refurbished instrument program."[725]

305. Further, Rebotix had developed a method to reset the EndoWrist in 2015-2016.[726] Rebotix had also begun selling such EndoWrist repairs in Europe in 2016 and the work for customers there was "a lucrative business."[727] Rebotix thus had any technological ability that it needed to enter the US market prior to May 2017 and, absent Intuitive's exclusionary agreements, it would have had significant

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[720] Stryker, *Better Together*, https://sustainability.stryker.com/better-together/ (accessed 11/30/2022).

[721] *See* discussion earlier in this paragraph and Restore-00083264-272.

[722] Intuitive-02068246 at 260 (Intuitive's internal analysis in 9/2016 noted "There is already one company in Florida (Rebotix) that claims to be able to extend instrument life and is currently attempting to qualify for CE mark for the extended-life instruments."); Intuitive-00194074 at 075 ("In 2016 Intuitive has identified 3rd party companies are reprogramming da Vinci Si instruments with additional uses.").

[723] Intuitive-00047082.

[724] *Id.*

[725] Intuitive-01067015 at 015.

[726] Papit (in *Rebotix*) 30(b)(6) Dep. at 59:6-13.

[727] *Id.* at 49:2-12 ("Q…When you started working at Rebotix, what countries did the country – what countries did the company operate in? A Rebotix, when we began, was movd to Panama, as I believe you probably – we shared that with you. And at that point, we were operating in Italy, France, Poland, Ukraine, Russia, and the UK. If memory serves me, I think that's correct. Q When was Rebotix moved to Panama? A Around 2016, I believe."), at 51:22-25 ("Q Was the work that Rebotix Panama did for customers in Europe a lucrative business for Rebotix? A Yes.").

economic incentives to do so, given that Rebotix distributor SIS estimated that its own potential revenue from selling EndoWrist repairs in the U.S. would be at least $250-350 million a year.[728] Instead, with the exclusionary restraints in place in the U.S. market, Rebotix did not begin utilizing Restore as a distributor until July 2018 and SIS as a distributor until Jun3 2019, and Rebotix itself did not directly enter the U.S. market until March 2019.[729]

306. Moreover, Intuitive's exclusionary enforcement appears to have dissuaded Stryker from purchasing Rebotix's EndoWrist repair business. Stryker signed a proposal to acquire Rebotix's S/Si EndoWrist assets in December 2015,[730] and had planning documents showing Stryker capturing market share by 2017.[731] However, in March 2016 Stryker abandoned its efforts after due diligence turned up Intuitive's exclusionary restraints.[732] Without the exclusionary restraints, the potential profits from entry would have been much higher, thus making it more likely that Stryker would have concluded it was economically rational to buy Rebotix and use its technology to enter the market.

307. To be sure, before May 2017, there is evidence that Stryker and Rebotix may have deferred entry in part because of their concerns about the then-current Lexmark ruling,[733] which was understood to involve "Federal Circuit rules that kept

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[728] Johnson (in *Surgical Instrument*) 30(b)(1) Dep. at 17:5-13 ("Q What did you calculate as the potential revenue from that business? A The numbers we had discussed, we felt strongly, and we were shooting low. We thought it was -- the opportunity was somewhere in the 250 to 350 thousand -- excuse me, 250 to 350 million dollars a year in revenue. Q Is that gross revenue? A Yes.").

[729] *See supra* Section II.E.1.

[730] Mixner (in *Rebotix*) Dep. Ex. 15 at REBOTIX139042-045. *See also*, Gibson (in *Rebotix*) Dep. at 101:10-21 (Stryker sent a team to the Rebotix facility in Florida as part of their due diligence, providing more evidence on the seriousness of this proposal).

[731] STRREB00001810.

[732] STRREB00000259 ("In summary, the risks associated with pursuing this project are too high relative to the potential reward. • OEM's ability to affect customer's service contracts, capital purchases and disposal rebates would drive savings from SSS to unacceptable levels. • OEM purchase agreements and service contracts are proprietary with no 3rd party options").

[733] Mixner (in *Rebotix*) Dep. at 117:2-9 ("Q (By Mr. Ruby) Why not? A From what I understand, it had something to do with this Lexmark ruling, which was the reason that Stryker Sustainability decided not to go forth with their bid on the business, and so we decided that – Stan was – told me our best move would be to go to Panama, since he has residency, and repair the products from overseas customers."); Hamilton (in *Rebotix*) Dep. at 48:6-25 ("Q. (By Mr. Ruby) And when Rebotix's strategy changed away from being acquired, what did it change to? A. … And the acquisition went away for a reason. It had nothing to do with any of the due diligence I was

some patent rights in place even after sales."[734] However, this entrant concern was mooted when that ruling was overruled by the Supreme Court in in May 2017 and thus would not have deterred entry after that time.[735]

308. Intuitive's exclusionary conduct also likely delayed entry by SIS and Restore. SIS heard about EndoWrist repair from Rebotix at a conference in 2019 and entered the market with its first sale 2019,[736] but SIS would have been interested in entering in 2016 had it had heard about the opportunity then.[737] Restore first heard about Rebotix's EndoWrist repair business at a conference in mid-April of 2018.[738] If Intuitive had not been artificially restraining the volume of EndoWrist repairs, it is likely that SIS and Restore would have heard about, and entered, the market earlier.

309. Beyond the evidence that rivals had developed a way to repair S/Si-compatible EndoWrists by the start of the Class Period, there is also evidence that a rival was exploring repair work on X/Xi-compatible EndoWrists prior to the start of the Class Period. Rebotix had considered developing a method of repairing X/Xi-compatible EndoWrists as early as 2014, but paused to prioritize working on the S/Si-compatible EndoWrists.[739] Kevin May of Restore likewise testified that Intuitive's exclusionary conduct "absolutely caused delays and harm to our business.

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involved with, by the way. It went away because of a very high level legal opinion about the Lexmark decision, which was later overturned by the Supreme Court.").

[734] Ryan Davis, *High Court Reins In Patent Owners' Post-Sale Power,* LAW360, 5/30/2017, https://www.law360.com/articles/914742/high-court-reins-in-patent-owners-post-sale-power (accessed 11/21/2022).

[735] *Id.* (noting that the Federal Circuit rules were overruled by the Supreme Court in May 2017); Hamilton (in *Rebotix*) Dep. at 48:23-25 (noting that the Lexmark concern with EndoWrist repair entry was mooted when it was later overturned by the Supreme Court).

[736] *See supra* Table 2.

[737] Johnson (in *Surgical Instrument*) 30(b)(1) Dep. at 48:3-18 ("Q And you testified that Rebotix gave a presentation at that 2019 AAMI conference. Do I have that right? A I don't know if they gave a presentation; they had a booth – Q Okay. A -- at the expo. […] Q And that exposure was what got the ball rolling with SIS and its EndoWrist repair business; is that fair? A Correct."), 49:4-10 ("Q Had you seen the Rebotix booth [where SIS first learned about EndoWrist repair] a couple of years earlier, let's say 2016, would SIS have been interested in the EndoWrist repair business then? […] THE WITNESS: A hundred percent.").

[738] Parker (in *Restore*) 30(b)(6) Dep. at 27:3-18. Restore later in 2018 went on to sign an initial agreement under which "Restore was to send the customers and their instruments to Rebotix, and Rebotix would do the work" followed "a couple months later" by a second agreement whereby Restore would buy chips from Rebotix and Restore would have "exclusive rights for all repairs in the United States." *Id.* at 53:21-56:2.

[739] REBOTIX110980-981 at 981.

We had been counting on the revenue that we were generating from the repair business to fund being able to do additional R&D efforts, to grow the business, and to grow the Xi business and to do the research development for the Xi."[740] Had the exclusionary restraints not limited the potential profits from entry, it would have made it more likely that Rebotix and Restore would have found it economically rational to invest more to develop methods of repairing both the S/Si- and X/Xi-compatible EndoWrists at the same time.[741]

V. INTUITIVE'S TYING AND EXCLUSIVITY RESTRAINTS FORECLOSED RIVALS FROM SERVICING DA VINCI ROBOTS

310. Intuitive's tying and exclusivity restraints foreclosed the entire market for servicing da Vinci robots. That foreclosure deterred entry, limited the only entrant to selling to the few hospitals willing not to comply with those restraints, and ultimately drove that sole entrant out of the market by enforcing those restraints. The excluded and limited entrants had the ability to service da Vinci robots, as evidenced by the fact that the one firm that temporarily entered was able to successfully provide da Vinci robot servicing. No factors other than the challenged restraints can reasonably explain the lack of successful entry into the U.S. market for servicing da Vinci robots. The foreclosure caused by the challenged restraints began before the start of the Class Period in 2017 and continues to foreclose entry to this day. I expand on each of these themes in the sections that follow.

A. Actual Rivals Were Capable of Servicing da Vinci Robots

311. Actual rivals were capable of servicing da Vinci robots. The clearest example of this is the fac that rival Restore did service da Vinci robots. Restore entered the market in 2019 doing work such as replacing batteries, repairing robot arms, and preventative maintenance.[742] Restore's entry into the market found success, initially being contracted for services that would have been worth hundreds

[740] May (in *In re: da Vinci*) Dep. at 75:16-76:1. *See also*, *id*. at 77:7-12 ("Q. Any EndoWrists, generally, that could not be repaired. A. There were EndoWrists that were the reusable type that we – we did not repair. But in the future, we could have, if we did some R&D efforts.").

[741] This argument also applies to certain types of S/Si- and X/Xi-compatible EndoWrists that third-party IRCs did not repair in the actual world. For example, Kevin May of Restore testified that, without Intuitive's anticompetitive conduct, Restore "would have expanded few more of the 8-millimeter and 5-millimeter EndoWrists." May (in *In re: da Vinci*) Dep. at 78:5-11.

[742] Restore-0055937.

of thousands in annual revenue.[743] Clif Parker of Restore testified that "The majority of the hospitals that we spoke to were very positive about us doing repairs [to the da Vinci robot], they wanted an alternative, they wanted as second look, somebody that could say, yes, that – that is the problem, they wanted another pricing alternative, they wanted another entity that could provide service potentially quicker, and less arrogant, and these were the things that – that we heard is they wanted a company like Restore to be in business to keep the industry running smoothly and give them options."[744] Hospitals wanted Restore to perform services such as replacing batteries, fixing arms, and other troubleshooting.[745] Even if Restore could not have provided the full range of da Vinci servicing because Intuitive's proprietary tools prevented rivals from producing some of those services,[746] this does not negate the fact that Restore was still able to enter the market and begin providing at least a portion of the servicing required for da Vinci robots.[747]

312. Although Restore only did servicing on the da Vinci Si robot during the brief time before Intuitive's restraints drove away all of its customers, it had plans to service other da Vinci models as well. Restore listed as the "[p]urpose of the company: (1) Provide PM's for Da Vinci Robots model S, Si (eventually x and Xi versions … (2) Provide Service for Da Vinci model S, Si (and eventually X and Xi versions)."[748]

313. Clif Parker of Restore testified that he was aware of three other firms that were considering entering the da Vinci robot service market: "Medtronic, I do know they had done some work in Europe; and then, of course, Medline, one or two worked with us; and Rebotix, as well, Rebotix was asking us for robot repairs for their customers."[749]

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[743] *Id.* (rows 25-39 with $615,000 worth of annual servicing with Baylor Scott & White Hospital).
[744] Parker (in *In re: da Vinci*) Dep. at 162:16-25.
[745] See *supra* Section I.B.3.i.
[746] *See supra* Section I.B.3.i.
[747] For example, Wasfy (in *Restore*) Dep. at 29:1-13 (e.g., "Just really for [R]estore to do the certain repairs and then have a separate service agreement with Intuitive on software issues, other repairs that can be fixed and the XI."). *See also*, *Supra* Section I.B.3.i.
[748] Restore-00005314. *See also*, Restore-00000965 at 967 ("Future capability (if current efforts decided in our favor) … Repair for Si and Xi Robots. Perform full repairs at all levels for all components including swapping out arms and any repairs that require software access to perform; Preventative Maintenance for Si and Xi Robots. Perform full PM including all software driven aspects."); Restore-00022762 (Clif Parker responding to email asking if Restore does maintenance on Xi robots, "Not at the present time but we are bringing on former xi field service techs very soon.").
[749] Parker (in *In re: da Vinci*) Dep. at 162:4-17.

314. In addition to Restore, Medtronic, Medline, and Rebotix, there are many third-party medical device servicing companies generally.[750] This shows that ISO repairs are a thriving part of the medical device sector. Many companies would potentially have had the connections and expertise to enter the da Vinci service market if it were not foreclosed. In addition, hospitals themselves potentially could have done da Vinci servicing themselves.[751]

B. Intuitive's Conduct Foreclosed the Entire Market

315. Every buyer of da Vinci service was subject to tying and exclusionary agreements that restrained their ability to buy from rivals,[752] so the foreclosure share was 100%. The fact that some hospitals temporarily were willing not to comply with their restraints does not mean they were not subject to restraints, especially since Intuitive was able to bring them all into compliance by enforcing those restraints.[753] Even if one were to conservatively treat as unforeclosed the breakthrough sales that one rival was temporarily able to obtain some sales before Intuitive closed them down by enforcing its restraints, the foreclosure share was still substantial, over 99.9% in each year and 100% in all but one. [754]

316. Even if the market were defined more broadly to include servicing of any MIST surgery robots, the foreclosure share would still be 99.5-99.6% because the da Vinci had over a 99.5-99.6% share of installed base of U.S. MIST surgery robots and foreclosed all servicing of those machines.[755] Even if one coupled this overbroad market definition with the conservative assumption that one should treat as unforeclosed the breakthrough sales that one rival was temporarily able to obtain some sales before Intuitive closed them down by enforcing its restraints, those sales only amount to 0-0.16% of the da Vinci servicing market,[756] and thus the foreclosure share would still remain an overwhelming 99.34-99.6%.[757]

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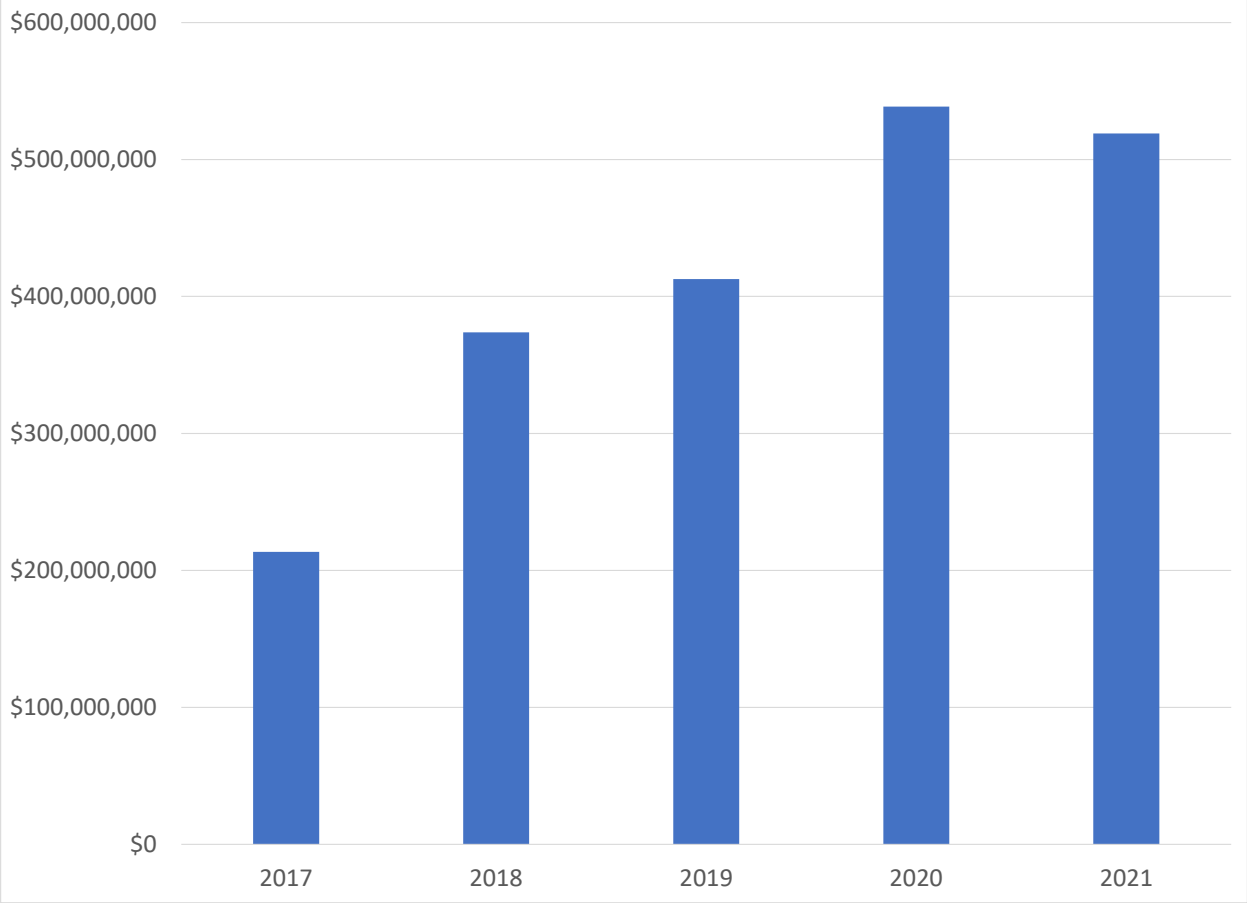
[750] *See supra* at I.C.
[751] Waninger (in *In re: da Vinci*) Dep. 60:12-16 ("THE WITNESS: So by the time we got to this point in this agreement, we had already asked Intuitive if they would provide service training for my team. They stated they would not provide service training…").
[752] *Supra* at Section III.A.2.
[753] *Supra* Section II.G.1 and Corrected Figure 9.
[754] *See supra* Corrected Figure 9.
[755] *See supra* Table 1.
[756] *See supra* Corrected Figure 9.
[757] At the low end, 99.5% x 99.84% = 99.34%. At the high end, 99.6% x 100% = 99.6%.

317. The dollar amount of foreclosure was likewise enormous. From the start of the Class Period through the end of 2021, Intuitive's sales of da Vinci S, Si, X, and Xi servicing foreclosed by the tying arrangement amounted to hundreds of millions of dollars a year in the U.S. See Figure 10 below.

Figure 10: Intuitive Revenue from da Vinci S, Si, X, and Xi Servicing 2017-2021[758]



C. Direct Evidence of Rival Exclusion Caused by Intuitive's Tying and Exclusivity Restraints

318. Evidence of rival foreclosure caused by Intuitive's tying and exclusivity restraints takes several forms. First, at hospitals which defied their restraints to purchase da Vinci servicing from Restore, Intuitive was able to enforce those restraints in a way that drove those hospitals to stop using such rival servicing. Second, Intuitive foreclosed hospitals which would have used Restore but for

[758] Source: Intuitive-00695236, Intuitive-00706089, Intuitive-00000316.

Intuitive's tying and exclusivity restraints. Third, Intuitive excluded potential entrants that simply did not enter in the face of those restraints.

1. Restore Was Driven Out of Hospitals that Initially Used Them

319. Several hospitals for a time defied their restraints and contracted with Restore to service their da Vinci robots, but Intuitive successfully enforced those restraints to prevent hospitals from continuing to do so. None of the hospitals that engaged Restore to perform da Vinci servicing continued to purchase da Vinci servicing from Restore after Intuitive enforced its exclusionary restraints.[759]

320. Restore indicates that it was Intuitive's actions which caused them to leave the marketplace. Clif Parker of Restore testified that their da Vinci servicing "business stopped as a result of Intuitive's actions."[760] In addition, Restore received a "cease and desist" letter from Intuitive.[761]

321. One of Restore's former customers testified that they would have continued using Restore to service da Vinci robots but for Intuitive's exclusionary restraints. Cairo Wasfy, corporate VP of supply chain pharmacy and lab at Ardent Health, agreed that he would "have kept using Restore Robotics for repairs on SI robots if Intuitive had not withheld all service on the SI robots."[762]

2. Restore Was Foreclosed from Hospitals that Would Have Used Them But For Intuitive's Exclusionary Restraints

322. Beyond those who did purchase third party da Vinci servicing, there were many hospitals who were potentially interested in using third parties to repair their da Vincis, but who were deterred by Intuitive's restraints. For example, Greg Posdal of SIS testified that there was "absolutely" interest in third party robot repair

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[759] Restore-00055935, Restore-00055937, Restore-00055938; Parker (in *Restore*) Dep. at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots."); Parker 10/25/2022 Dep. at 165:18-19 ("A -- once that -- you know, the [da Vinci servicing] business stopped as a result of Intuitive's actions.").

[760] Parker (in *In re: da Vinci*) Dep. at 165:18-19.

[761] May (in *In re: da Vinci*) Dep. at 75:12-13 ("Then there was also a cease and desist letter that we received from Intuitive Surgical.").

[762] Wasfy (in *Restore*) Dep. at 8:9-12, 8:24-9:1, 39:22-40:3.

because "hospitals thought that the [Intuitive] service contracts for the robots were excessive and they were looking for an option."[763]

3. Potential Entrants to Third-Party da Vinci Service Were Foreclosed Due to Intuitive's Exclusionary Restraints

323. There are numerous companies specializing in third party servicing of medical devices who could potentially have entered the market. Close to 20 thousand companies are estimated to be in the business of servicing used medical devices in the U.S. alone.[764] Clif Parker of Restore testified that he's "heard that 30, 35 percent of all the repairs in the U.S. are done by third-party repair companies."[765] Some of these companies could have potentially had the connections and expertise to enter the da Vinci servicing market if it were not foreclosed. For example, Clif Parker of Restore testified that he was aware of three other firms that were considering entering the da Vinci robot service market: "Medtronic, I do know they had done some work in Europe; and then, of course, Medline, one or two worked with us; and Rebotix, as well, Rebotix was asking us for robot repairs for their customers."[766]

324. Economic theory predicts that high margins generally induce entry.[767] Intuitive was earning high margins selling da Vinci servicing (see section II.G.2 above). This suggests that absent Intuitive's conduct, firms would have strong incentives to develop a way to perform third-party service on da Vinci robots.[768]

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[763] Posdal (in *Surgical Instrument*) 30(b)(1) Dep. at 81:5-19.
[764] Intuitive-00552993-3014 at 997.
[765] Parker (in *In re: da Vinci*) Dep. at 161:25-162:4.
[766] *Id.* at 162:4-17.
[767] PINDYCK & RUBINFELD, MICROECONOMICS 377 (8th ed. 2013) ("Large short-run profits can induce new firms to enter an industry"); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 116 (4th ed. 2005) ("In most markets, positive economic profits would attract new entrants.").
[768] Even if it is technically feasible for a rival to enter, raising rivals' costs can still have an anticompetitive and/or exclusionary effect. See, for example, Thomas G. Krattenmaker & Stephen C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price*, 96 YALE L.J. 209, 234–45 (1986); Stephen C. Salop & David T. Scheffman, *Raising Rivals' Costs*, 73 AM. ECON. REV. 267 (1983) (Special Issue).

D. Intuitive's Tying and Exclusivity Restraints Were a Substantial Cause of Hospitals' Failure to Use Third-Party da Vinci Servicing

325. The evidence above in Section V.C shows that Intuitive's conduct directly (causally) led to rivals being excluded.[769] Intuitive may argue that there were instead *other* reasons that third-party da Vinci service businesses (including Restore and potential entrants) would have failed in the but-for world, even absent Intuitive's use of tying and exclusionary restraints.[770] For example, Intuitive may argue that the rivals would have faced (1) practical hurdles (like convincing customers of safety and efficacy, especially in light of Intuitive's threats and misinformation); (2) capacity constraints; or (3) lack of access to proprietary service laptops. Here, I show that no such reasons were significant factors (if factors at all) in the exclusion of these rivals.

1. Hospital Perceptions About Third-Party da Vinci Service Did Not Cause the Exclusion of Third-Party IRCs

326. Hospital perceptions about third-party da Vinci servicing did not cause the exclusion of third-party IRCs. The large market for third-party ISOs suggests there is general acceptance of at least some degree of third-party servicing.[771] And, specific to this case, when Restore's services were available, several hospitals used them.[772]

2. Capacity Constraints Did Not Prevent Rivals from Servicing da Vincis

327. Capacity constraints did not exclude third parties from servicing EndoWrists. Restore was sufficiently capitalized "to run a viable business."[773] Other potential entrants, such as Medtronic and Medline,[774] were also sufficiently capitalized. Medtronic was valued at over $30 billion and had $10.5 billion in cash

[769] One can also infer such causality from the combination of evidence on total market foreclosure (see Section IV above) and evidence of anticompetitive effects (see Section VI below).
[770] For example, Intuitive may argue that the rivals would have faced regulatory hurdles (like 510(k) clearance) and practical hurdles (like convincing customers of safety and efficacy).
[771] *Supra* Section I.C.
[772] Restore-00055937.
[773] May (in *Restore*) Dep. at 157:25-158:2.
[774] Parker (in *In re: da Vinci*) Dep. at 161:4-12.

and investments and access to another $3.5 billion in credit.[775] Rebotix was well-capitalized enough to have sunk $5 million into EndoWrist repair R&D, and is continuing to do research even though its "ability to finance the business" "was impacted significantly by the actions that Intuitive took."[776]

328. I am unaware of any technical or operational constraints that would have excluded Restore from continuing to service da Vincis. Clif Parker of Restore testified, "We had many more technicians that were ready to go, but we were unable to pull the trigger because it didn't makes sense to bring somebody on and hire them and put them on salary and not be able to service the – the robots because Intuitive would cut the customers off."[777]

3. Lack of Proprietary Tools Did Not Mean Rivals Could Not Have Provided Any da Vinci Servicing

329. While some types of service required by the da Vinci can only be fully resolved by using proprietary tools that are only available from Intuitive, this does not and did not prevent rivals from providing other sorts of da Vinci servicing.[778] At most, it would have prevented some types of da Vinci servicing from being performed by rival service providers. This still left a variety of services which third parties could and did perform. For example, prior to Restore being excluded by

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[775] Medtronic plc Form 10-K for the fiscal year ended April 29, 2022, at 45 ("Our liquidity sources at April 29, 2022 included $3.7 billion of cash and cash equivalents and $6.9 billion of current investments. Additionally, we maintain commercial paper programs and a Credit Facility. . . .We maintain multicurrency commercial paper programs for short-term financing, which allow us to issue unsecured commercial paper notes on a private placement basis up to a maximum aggregate amount outstanding at any time of $3.5 billion. At both April 29, 2022 and April 30, 2021, we had no commercial paper outstanding. . . . We also have a $3.5 billion five-year syndicated credit facility (Credit Facility), which expires in December 2026. . . . At April 29, 2022 and April 30, 2021, no amounts were outstanding under the Credit Facility."); Cara Lombardo and Miriam Gottfried, *Medline Deal Signals Return to Days of Huge Leverage Buyouts*, Wall Street Journal, June 6, 2021, https://www.wsj.com/articles/medline-deal-signals-return-to-days-of-huge-leveraged-buyouts-11623017872 (accessed 11/27/2022) (Medline is "valued at more than $30 billion").

[776] Hamilton (in *In re: da Vinci*) Dep. at 10:11-11:6; *Rebotix Repair LLC vs. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274, Declaration of Glenn Papit, December 8, 2021, at ¶¶ 4-5.

[777] Parker (in *In re: da Vinci*) Dep. at 193:20-194:2. *See also*, *id*. at 198:6-10 ("Q So you were in the – you had made offers to individuals, offers of employment to people? A Yes. Q How many? A I believe four, three or four.").

[778] *See supra* Sections I.B.3.i and II.F.4.

Intuitive, customers such as Hillcrest planned to use Restore for the repairs that it could perform and Intuitive for the rest.[779]

E. The Exclusion of Third Parties from Servicing da Vincis Began Before the Class Period Starts in May 2017

330. Intuitive's exclusionary restraints on rival servicing were in place before the start of the Class Period in May 2017. As noted above, these restraints had been in all da Vinci sales contracts since 2006.[780] Those same restraints were, for example, in the sales, license, and service agreement between Intuitive and South Broward Hospital District dated December 28, 2016.[781] Thus, those restraints have been foreclosing rivals from entering the da Vinci servicing market since well before May 2017.

331. Further, there is evidence that the exclusionary restraints foreclosing EndoWrist repair entry also would discourage entry into the da Vinci servicing market because firms found it efficient to enter both markets at the same time. Clif Parker of Restore testified as follows:

> **Q** Was Restore's entry into the da Vinci service market linked to its entry into the EndoWrist repair market?
> **A** We would not have got into the robot repair business but not for the EndoWrist repair business.
> **Q** So you were getting into the EndoWrist repair business and you figured we're going to be in one of them, let's do the end – let's do the robot service as well; is that right?
> **A** That's correct.[782]

Accordingly, all the evidence cited above showing that without Intuitive's exclusionary restraints, firms would have had incentives to be EndoWrist repair entrants by the beginning of the class period in May 2017 also indicate that without

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[779] Wasfy (in *Restore*) Dep. at 29:1-13.
[780] *See supra* Section III.A.2.
[781] Intuitive-00005135-147 at 137 (§5.2(A) "Intuitive does not have an obligation to provide Services (1) on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive or (2) which are either necessary or desired as a direct or indirect result, in whole or in part, of unauthorized repair…"). *See also*, Madewell (in *Restore*) Dep. Ex. 3 at PANAMACITY000036-037; Vavoso (in *Rebotix*) Dep. Ex. 24 at Intuitive-00067541; Intuitive-00299311-326 at 313; Intuitive-01846020-034 at 022; Intuitive-01989020-038 at 028.
[782] Parker (in *In re: da Vinci*) Dep. at 164:21-165:6.

those exclusionary restraint, firms would have had incentives to be da Vinci servicing entrants by then as well.

VI. THE EXCLUSION OF INTUITIVE'S RIVALS CAUSED ANTICOMPETITIVE EFFECTS COMPARED TO A BUT-FOR WORLD WITHOUT INTUITIVE'S RESTRAINTS

A. Economics Indicates that the Exclusion of Innovative Rivals Like Rebotix, Restore, and SIS Through Substantial Foreclosure Creates Anticompetitive Harm

332. In this section, I demonstrate that economics indicates that the exclusion of innovative rivals like Rebotix, Restore, and SIS from the relevant markets would create anticompetitive harms and that such anticompetitive harms are confirmed by evidence in this case. As a general matter, from an economics perspective one would expect economic injury when third party IRCs are excluded. Indeed, the FDA has concluded that "[t]he continued availability of third party entities to service and repair medical devices is critical to the functioning of the U.S. healthcare system."[783] In the following sections, I demonstrate five concrete forms of economic harm, including (1) higher prices and lower output resulting from higher prices, (2) suppressed use limits, (3) loss of buyer choice, (4) reduced innovation, and (5) higher environmental costs.

1. Fundamental Economics Predicts Adverse Price and Output Effects

333. Basic economics shows that, all else being equal, prices in a monopoly market decrease as the number of competitors in the market increases.[784] (Examples

[783] FDA, *Report on the Quality, Safety and Effectiveness of Servicing of Medical Devices*, May 2018, at i, available at https://www.fda.gov/media/113431/download.

[784] PINDYCK & RUBINFELD, MICROECONOMICS 376 (8th ed. 2013) ("The second determinant of a firm's demand curve—and thus of its monopoly power—is the number of firms in its market. Other things being equal, the monopoly power of each firm will fall as the number of firms increases: As more and more firms compete, each firm will find it harder to raise prices and avoid losing sales to other firms. What matters, of course, is not just the total number of firms, but the number of 'major players'—firms with significant market share."); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 210-211 (4th ed. 2005) ("Entry Lowers Prices". Table 7.2 shows how the profit-maximizing price in a Cournot monopolist market decreases as the number of firms in the market increases. Example 7.2 describes how the entry of new firms was "very likely responsible" for significant airline prices decreasing "as much as 70 percent"); *id.* at 244

from generic entry in the pharmaceutical context corroborate this.[785]) Thus, economics has long recognized that incumbent firms can anticompetitively inflate prices by excluding rivals from competing in the market.[786] Indeed, a dominant firm can anticompetitively inflate prices merely by slowing the growth of rivals or increasing their costs, even if the firm does not force rivals to completely exit the market.[787] Economics recognizes that eliminating even a single significant rival can anticompetitively inflate prices.[788] And here, Intuitive has achieved a rare feat: it has excluded *every* significant rival in the relevant repair and servicing markets.[789]

("Theories on competitive and noncompetitive markets hold that the less competition a firm faces, the greater its *market power*: the ability to set price profitably above marginal cost.") (emphasis in original).

[785] *See*, e.g., U.S. Food & Drug Administration, *Generic Competition and Drug Prices*, http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDER/ucm129385.htm (accessed 11/12/2022) (For example, "Previous FDA research shows the relationship between generic competition and drug prices, with market entry of just a few generic competitors yielding generic prices well below the brand price" and later citing an analysis which "demonstrates that greater competition among generic drug makers is associated with lower generic drug prices."); *see also*, e.g., Reiffen and Ward, *Generic Drug Industry Dynamics*, THE REVIEW OF ECONOMICS AND STATISTICS 87(1), February 2005, pp. 37-49.

[786] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 425 (4th ed. 2022) ("the major anticompetitive concern is that [exclusive dealing] agreements might foreclose[] enough of the market to rivals as to impair competition. Such foreclosure might impede rival efficiency, entry, existence, or expandability, any of which can anticompetitively increase the market power of the foreclosing firm."); Ordover & Saloner, *Predation, Monopolization and Antitrust,* Chapter 9 in HANDBOOK OF INDUSTRIAL ORGANIZATION, VOLUME I (1989) at 541 ("As part of profit maximization, a firm's management can engage in potentially anticompetitive conduct [by] engag[ing] in practices that disadvantage actual rivals, without necessarily causing their exit, but which relax the competitive constraint exercised by them over the dominant firm.").

[787] XI AREEDA & HOVENKAMP, ANTITRUST LAW ¶1802c (3d ed. 2011) ("suppose an established manufacturer has long held a dominant position but is starting to lose market share to an aggressive young rival. A set of strategically planned exclusive dealing contracts may slow the rival's expansion by requiring it to develop alternative outlets for its product or rely at least temporarily on inferior or more expensive outlets. Consumer injury results from the delay that the dominant firm imposes on the smaller rival's growth.").

[788] *See, e.g.*, DOJ/FTC Horizontal Merger Guidelines §7.1 (2010) ("eliminating a maverick firm [i.e., a "firm that plays a disruptive role in the market to the benefit of consumers"] in a market vulnerable to coordinated conduct is likely to cause adverse coordinated effects.")

[789] May (in *In re: da Vinci*) Dep. at 77:17-78:4 ("Q. Okay. And since 2019, Restore has not done any EndoWrist repair; is that correct? A. We have done repairs that did not require resetting the counter. Q. Okay. Was there any repairs that required resetting the counters? A. No. Q. Was there any repairs that Restore actually sent back to the hospitals for use? A. No. Q. And why is that? A. Our customers were too afraid to send use the business."); Hamilton (in *In re: da Vinci*) Dep. at 35:12-22 ("Q. Okay. Is Rebotix today repairing EndoWrists? And I'm using the word

334. This basic theory is corroborated by all the other evidence here in Section VI. The price of repaired EndoWrists from Rebotix, Restore, and SIS was, on average, 45% cheaper than what Intuitive charged for replacement EndoWrists.[790] Servicing of the da Vinci was offered by Restore at rates as much as 74% cheaper than what Intuitive was offering.[791] The EndoWrist savings were so significant that the Kaiser hospital system gave an award to the employee who found SIS's offerings.[792] The only way to obtain savings from repair instead of replacement was to purchase from these (now excluded) rivals, because Intuitive was unwilling to offer the repair method that it had been developing.[793] Many customers would have

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'repair' the way you've been using it today. A. Rebotix has the capability to repair them. I don't think there are -- there's any string coming through right now. But again, I -- I don't know that we would turn it away if it came in right now. I'm just not certain. I'm not involved in day-to-day operations. Again, I'm not even in that physical location right now. But if we are, it would be a very, very small amount."); Parker (in *In re: da Vinci*) Dep. at 130:2-20 (Restore hasn't reset use counters for hospitals since 2019 time-frame); Posdal (in *Surgical Instrument*) 30(b)(6) Dep. at 22:13-17 (SIS out of the EndoWrist repair market by 2019 or 2020); Parker 5/4/2021 Dep. at 184:8-16 ("Q. (By Mr. Ruby) And had your [Restore's] business pertaining to the Rebotix technology [i.e., Restore licensing Rebotix technology for EndoWrist repair], by that point, dropped off so much that it wasn't economical in your judgment to try to stay in business? […] THE WITNESS: Well, we haven't gone out of business; but we stopped pursuing for the time being the repair of instruments and the repair of da Vinci robots."). Papit (in *Rebotix*) 30(b)(6) Dep. 33:3-16 (Rebotix "is basically not functional at this moment"); *supra* Table 2 and Corrected Figure 9.

[790] *Infra* Section VI.B.3. Harrich (in *Rebotix*) Dep. at 63:15-19 (Harrich agreed that "reducing the costs of EndoWrists by using the Rebotix Repair service improve[s] the hospital's profitability associated with procedures that used the da Vinci system.").

[791] *Infra* at Section VI.D.1.

[792] Posdal (in *Surgical Instrument*) 30(b)(1) Dep. at 77:14-78:11.

[793] *See*, e.g., Scoville (in *Rebotix*) Dep. Ex. 7 at Intuitive-00103429 ("Instrument Refurbishing (Project Dragon)"), Intuitive-00103439 ("Feasibility Work Completed" including "Confirmed on in house life test units and re-built RMA units" and "Confirmed clinical utility was equivalent or better than new instruments."); Scoville (in *Rebotix*) Dep. at 11:23-13:15 (Intuitive considered refurbishing EndoWrists but never did so); Scoville (in *Restore*) Dep. at 9:25-10:3 ("Q. And at any point did Intuitive start to refurbish the core instruments for the Si in the United States for its customers? A. No."); *id.* at 11:3-15 ("Q. And I just want to make sure, did you have any understanding of why the executive team chose not to proceed with refurbishing the SI instruments? A. My recollection is it was a prioritization question. Q. What do you mean by 'prioritization'? A. What investments, you know – how to describe that? Just the – the timing, level of investment. Market opportunity would have been assessed. Technical feasibility, if it had been assessed, would have been looked at and weighed against other projects. And we would have decided where to spend our time and energy.").

purchased from these IRCs but for the exclusionary conduct.[794] Intuitive's own analysis found that "the #1 Customer Requirement…Lower Cost."[795]

335. In addition to the lower prices directly offered by IRCs, economic theory predicts that an incumbent monopolist will also lower its own prices in response to rival competition. Indeed, Intuitive was concerned that hospitals would use the availability of competitors to "beat us up on price."[796] And evidence cited below shows that, when planning responses to expected entry by EndoWrist repair providers, Intuitive internally proposed large price cuts on EndoWrists, but its exclusionary restraints limited and ultimately drove out those repair rivals in a way that obviated the need to implement those planned price cuts.[797]

336. Economic theory also predicts that lower prices resulting from competition will increase consumer welfare. Intuitive's own analysis corroborates this, noting that refurbishing EndoWrists would "release trapped value in the instruments and give customers a way to reduce their costs."[798]

337. A price effect is equivalent to an output effect as a matter of theory.[799] This theoretical prediction was also the expectation of Intuitive, academics, Wall Street analysts, and surgeons. Intuitive's internal analysis shows that it expected lower prices would lead to higher output in the form of more procedures using the da Vinci robot.[800] Academic journals also expected that lower prices due to increased competition would increase output.[801] Wall Street analysts concluded that rival

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[794] *See* Sections IV and V above.
[795] Intuitive-00555598 at -00555608.
[796] Intuitive-00113020.
[797] *See supra* Table 2 and Section IV.B & *infra* Section VI.B.1.
[798] Intuitive-02068246 at 260.
[799] For example, ROBERT S. PINDYCK AND DANIEL L. RUBINFELD, MICROECONOMICS 24 (8th ed. 2013), states, "The demand curve, labeled D, shows how the quantity of a good demanded by consumers depends on its price. The demand curve is downward sloping; holding other things equal, consumers will want to purchase more of a good as its price goes down." Given that standard model, higher prices are associated with lower output.
[800] Intuitive-00261446; Intuitive-00246469 at 489 ("Cost is still a concern for users of RAS, and this can impact the choice of surgical technique (e.g., not using the robot for simple cases)"); Intuitive-010017712 at 712 (Lowering I&A per-use prices through the extended use program "will increase dVP [da Vinci Prostatectomy] volume in key regions."); *id.* ("Opportunity to decrease I&A [instrument and accessory] cost to a point that will increase dVP volume in key regions").
[801] Longmore et al. (2020) at 16 ("With competition now in the market for laparoscopic robotic assisted surgery, costs for RAS systems and consumables should start to come down. Considering

OEM entry "into surgical robotics will be market-expanding."[802] Surgeons whom Intuitive contacted in France "confirmed they would perform more da Vinci procedures if costs per procedure decrease."[803]

338. Industry participants were aware that higher EndoWrist prices were leading to lower output. Intuitive noted that costs were a barrier to more widespread use.[804] Intuitive's internal analysis concluded that allowing secondary markets (i.e., third-party repair of EndoWrists) would "[i]ncrease da Vinci adoption."[805] One surgeon described the reduction in output from Intuitive's business model as follows:

> I believe that this technology [the da Vinci robot] really improves the ability of surgeons and improves the outcome for patients; and it should be ubiquitous. It should be in rural markets. It should be in third-world countries; and rural, impoverished patients should have the opportunity to have robotic surgery. And this current business plan [of Intuitive] is not going to allow that to happen.[806]

339. The experience of Panama City Surgical Center in Florida provides an illustration of why a price effect can be expected to lead to an output effect. Michael Madewell, the managing partner of Panama City Surgical Center, worried that high service contract prices would force them to stop using the da Vinci robot (i.e., reduce output) in the face of high service contract prices.[807] They ultimately were able to

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the benefits to the patient and reduction in cost, we should see an increase [sic] use of RAS for laparoscopic procedures.").

[802] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at Intuitive-00278204.

[803] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 38 at Intuitive-00273292.

[804] Intuitive-00261446; Intuitive-00246469 at 489 ("Cost is still a concern for users of RAS, and this can impact the choice of surgical technique (e.g., not using the robot for simple cases)"); Intuitive-010017712 at 712 (Lowering I&A per-use prices through the extended use program "will increase dVP [da Vinci Prostatectomy] volume in key regions."); Intuitive-01017712 at 712 ("Opportunity to decrease I&A [instrument and accessory] cost to a point that will increase dVP volume in key regions").

[805] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 38 at Intuitive-00273265 ("User Benefits of Secondary Markets…Decrease the environmental impact of da Vinci products.") and Intuitive-00273272 ("Secondary Markets Roadmap" consists of "Refurbished Systems," "Refurbished Instruments," and "After Market Products" (the latter of which is just "Vision Boom")); Intuitive-00103456-478 at 459.

[806] Dickens (in *Restore*) Dep. at 29:4-12.

[807] Madewell (in *Restore*) Depo at 8:23-9:15, 83:25-86:24.

pay less by switching to time-and-materials repairs.[808] If they had been forced to purchase the more expensive service contract, they would have reduced output.

2. Suppressed Use Limits

340. The evidence also suggests that Intuitive reinforced its other exclusionary restraints by setting use limits on EndoWrists artificially low, as described in Section VI.C below. This was a source of anticompetitive harm in various ways. First, this restraint on the number of times EndoWrists can be used suppressed rival repair competition because it made EndoWrists less likely to last long enough to need many types of repairs. Second, it restricted consumer choice by denying consumers the right to use their product more often. Third, it effectively raised the per-use price for EndoWrists by artificially reducing their usage.

341. Hospitals did not ask for the use limits being imposed on them. Doctors wanted the ability, as they had on traditional laparoscopic devices, to determine for themselves whether an instrument was fit for additional use.[809] I have seen no evidence that imposing these limits solved an issue with doctors using devices for an unsafe number of times.[810]

342. Increasing the use limit without a proportionate increase in the per-unit price would be economically equivalent to a reduction in price. After all, it would cause the per-use price to decline and the total amount spent to achieve the same number of uses to go down. This is what Intuitive did for several EndoWrists in 2020 as part of its "extended use" program.[811] Intuitive expected this would have an output effect, with "about a quarter's worth of growth pulled forward by EUP [the Extended Use Program]."[812]

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[808] *Id.* at 19:22-20:3 ("Q. Is Panama City Surgery Center still on a service plan? A. No, we are not. Q. Why not? A. We couldn't afford it. Q. So you've gone to time and materials? A. We have.").

[809] Dickens (in *Restore*) Dep. at 30:13-31:21. *See also*, Harrich (in *Rebotix*) Dep. at 34:2-7; Donovan (in *Rebotix*) Dep. at 29:14-18, 30:3-6.

[810] To the contrary, see discussion in Section VI.F below.

[811] See following paragraph for more discussion on Intuitive's decision-making process regarding these use limits.

[812] Intuitive-01210839- at 860. *See also*, Intuitive-00594657- at 657 ("Instrument Extended Use Program"), 660 ("Objectives…Accelerate adoption of da Vinci surgery in priority markets & procedures where economics are a barrier to adoption.").

343. In October 2020, Intuitive began offering extended use versions of several EndoWrists.[813] Intuitive expected its extended use program to result in overall "X/Xi instrument cost savings of 9% to 15% for the majority of U.S. customers."[814] The instruments whose use limits were extended "represent[] some of [Intuitive's] higher volume instruments….Instruments included in the program are used across a number of da Vinci procedures."[815]

344. Just as raising the use limit without a proportional increase in unit price effectively lowers the per-use price, suppressing use limits would have the same effect as raising prices—including having a negative effect on output, in the form of reducing the number of procedures using EndoWrists and da Vinci robots. Intuitive's internal analysis reflects this, with an internal presentation indicating that "Extended Life" program objectives include "[p]rovid[ing] incremental universal access to dV [da Vinci] surgery by reducing price barriers."[816]

3. Loss of Consumer Choice

345. Even if there were not a price or output effect, the loss of consumer choice has an anticompetitive effect when, as in this case, there is no procompetitive benefit from the challenged conduct.[817]

346. Testimony from surgeons supports the idea that they valued having the choice of when an instrument needs repair or replacement. For example, one surgeon stated they "…would love to be able to use an instrument until it is no longer useful as determined by me and not have a company tell me when it is no longer useable."[818]

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[813] Intuitive-00955977 (10/5/2020 rollout extended use products, 10/23/2020 discontinue old 10-use products); Intuitive-00955978-995 at 989; Intuitive-00955978-995 at 993 ("New part number 471-XXX").

[814] Intuitive, *Extended Use Program for da Vinci X/Xi Instruments*, https://www.intuitive.com/en-us/about-us/company/instruments-program-notice (accessed 8/9/2022). *See also*, Intuitive 2020 10-K ("our Extended Use Program and the reduced pricing on certain other instruments would have reduced 2019 annual instruments and accessories revenue by approximately $150 to $170 million").

[815] Intuitive Surgical Form 10-K FY2020 at 7.

[816] Intuitive-00471993-997 at 994.

[817] *See, e.g.*, Robert H. Lande, *Consumer Choice as the Ultimate Goal of Antitrust*, 62 U. PITT. L. REV. 503 (2001); *infra* at Section VI.F (showing there is no procompetitive benefit).

[818] Dickens (in *Restore*) Dep. at 30:19-22.

4. Reduced Innovation

347. Economic theory indicates that exclusionary restraints can suppress innovation.[819] Consistent with this, commentators within the medical field have expressed frustration that Intuitive's restraints have eliminated "competition that might…generate innovation."[820] They have also expressed the view that Intuitive's decades-long monopoly has "led to…relatively slow innovation."[821]

348. Direct evidence on the potential reduction or slow-down in innovation can be seen by looking at Intuitive's own actions. For example, Intuitive knew there was "broad interest in an ISI refurbished instrument program"[822] and that refurbishing would "release trapped value in the instruments and give customers a way to reduce their costs."[823] However, Intuitive abandoned its own efforts to provide repaired EndoWrists and excluded rivals from doing so.[824] Similarly, evidence suggests that Intuitive has been artificially suppressing the use counter limit on its EndoWrists and has never even tested to see if those of the S/Si-compatible EndoWrists could be increased like those of the X/Xi-compatible ones.[825]

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[819] Federico, Scott Morton, & Shapiro, *Antitrust and Innovation: Welcoming and Protecting Disruption*, Chapter 9 in INNOVATION POLICY AND THE ECONOMY, VOLUME 20 (2019), pp. 125-190 at 125 ("A dominant firm may engage in exclusionary conduct to eliminate the threat from disruptive firms. This suppresses innovation by foreclosing disruptive rivals and by reducing the pressure to innovate on the incumbent.").

[820] Intuitive-00246469-491 at 489 ("…frustration felt due to the monopoly position that da Vinci has, which requires hospitals to buy equipment and maintenance for their da Vinci systems directly, with no competition that might improve pricing or generate innovation.").

[821] Pradeep P. Rao, *Robotic surgery: new robots and finally some real competition!*, WORLD JOURNAL OF UROLOGY, Vol. 36(4), April 2018, 537-541 at 537 ("For the last 20 years, the predominant robot used in laparoscopic surgery has been Da Vinci by Intuitive Surgical. This monopoly situation has led to rising costs and relatively slow innovation.").

[822] Intuitive-01084898-901 at 899.

[823] Intuitive-02068246-297 at 260.

[824] Scoville (in *Restore*) Dep. at 9:25-10:3 ("Q. And at any point did Intuitive start to refurbish the core instruments for the Si in the United States for its customers? A. No.") 11:3-15 ("Q. And I just want to make sure, did you have any understanding of why the executive team chose not to proceed with refurbishing the SI instruments? A. My recollection is it was a prioritization question. Q. What do you mean by 'prioritization'? A. What investments, you know – how to describe that? Just the – the timing, level of investment. Market opportunity would have been assessed. Technical feasibility, if it had been assessed, would have been looked at and weighed against other projects. And we would have decided where to spend our time and energy."). *See e.g.*, *supra* at Section IV.

[825] *See, e.g.*, *supra* Section VI.A.2 and *infra* Sections VI.C and VII.A.2.

5. Environmental Costs

349. Another economic injury from Intuitive's exclusion of EndoWrist repair is harm to the environment. "Recent revelations indicat[e] the healthcare industry ranks second only to the food industry in waste generation."[826] Intuitive was aware that blocking the repair of EndoWrists had a negative environmental impact.[827] When Intuitive expected a serious threat from rival EndoWrist repair entry, Intuitive proposed (as part of Project Dragon) its own repair program that it concluded would result in a "[r]eduction in waste" and "[r]ecycling of valuable materials," which would result in monetary savings to hospitals.[828] Intuitive further noted that from the increased repair of EndoWrists "hospitals will also benefit from reduced environmental and economic overhead associated with dV [da Vinci] waste,"[829] thus showing that this environmental benefit would enhance consumer welfare in this market. Those benefits were never realized because Intuitive's exclusionary restraints limited and ultimately drove out rival EndoWrist repair providers and Intuitive abandoned its plan to offer repaired EndoWrists itself.[830]

B. Direct Evidence of Anticompetitively Inflated Prices for New and Repaired EndoWrist Replacements

350. I have already shown that, in a but-for world without Intuitive's use of exclusionary restraints, there would be more rival competition in the EndoWrist repair and replacement market. I have also shown that economic theory predicts that suppressing that competition would result in anticompetitive harms (including increasing repair and service pricing and environmental harms and decreasing output, consumer choice, and innovation) that are confirmed by evidence in this

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[826] IBISWorld, *Surgical Instrument Manufacturing*, OD4103, July 2022, at 13.

[827] DeSantis (in *Rebotix*) Dep. Ex. 38 at Intuitive-00273265 ("User Benefits of Secondary Markets…Decrease the environmental impact of da Vinci products."); Intuitive-00273272 ("Secondary Markets Roadmap" consists of "Refurbished Systems," "Refurbished Instruments," and "After Market Products" (the latter of which is just "Vision Boom"); Intuitive-00103456-478 at 459.

[828] Intuitive-00273264-294 at 284. Intuitive estimated that the savings from reduced waste alone (which ignores the other benefits described in this paragraph) would be $0.08 (=0.4 x $0.2) to $0.20 (=0.4 x $0.5) per EndoWrist. *See* Intuitive-00581814-883 at 851 ("$0.20 - $0.50 Range of the average cost per pound to dispose of medical waste" "0.4 lbs. Intuitive Xi instruments average approximate weight.").

[829] Intuitive-00103456-478 at 458 (Regarding the "Refurbished Base Instrument Program" "hospitals will also benefit from reduced environmental and economic overhead associated with dV [da Vinci] waste").

[830] *See supra* Table 2 and Sections IV.B and IV.A.4, *infra* Section VI.B.1.

case. Here, I detail evidence that, without the anticompetitive restraints, Intuitive would also have charged lower prices for its own new or repaired EndoWrist replacements and that many buyers could have bought repaired EndoWrists at lower prices offered by rivals. This is done using several competitive benchmarks and yardsticks.

1. Benchmark for Intuitive Prices—The Price Cuts Intuitive Internally Proposed as Part of Project Dragon When It Feared Effective EndoWrist Repair Entry

351. By the start of 2017, Intuitive was concerned about potential competition from IRCs in the market for EndoWrist repair and replacement. In January of that year, Intuitive was generating "Reactive" internal and external responses to Rebotix.[831]

352. A competitive response considered by Intuitive, code-named "Project Dragon" in some documents, involved Intuitive offering repaired EndoWrists. This response was, at least in part, a reaction to the competitive threat faced by rival EndoWrist repair.[832] Intuitive considered a variety of price points as part of this program. One presentation proposed offering repaired EndoWrists at 25%, 30%, and 40% discounts off the list price of new EndoWrists.[833] Another proposed a simple 20% discount for a mix of new and repaired EndoWrists.[834] As described in Section VI.B.3 below, these proposed Intuitive discounts on repaired and new EndoWrists were within the range offered by rivals for repaired EndoWrists. This makes sense given that, as described in Section II.D.2, hospitals view repaired EndoWrists are functionally equivalent to replacement EndoWrists. Intuitive's exclusionary restraints succeeded in suppressing and ultimately driving out all

[831] Intuitive-01084898.

[832] Intuitive-00273260; Intuitive-00273261-263 at 261 ("Update (Code Name: Dragon): as of 23 May 2017" "Company Objectives…Defensive revenue and margin protection: Displace non-validated 3rd party re-programmers where already present"); Intuitive-00273264-294 at 266 ("Company Benefits of Secondary Markets" includes "[c]ombat utilization of 3rd party after market refurb or reprogrammed instruments"), 267 ("Dragon (Remanufactured Base Instrument Program)…Confidence Displace non-validated 3rd party re-programmers").

[833] DeSantis (in *Rebotix*) Dep. Ex. 38 at Intuitive-00273287. I do not rely on the somewhat lower discounts considered in Intuitive-00581814-883 because that document was not part of Project Dragon but rather was from August 2019, which is after it was clear that the competitive threat had been successfully suppressed by the anticompetitive restraints.

[834] Scoville (in *Restore*) Dep. Ex. 1 at Intuitive-00104185 ("A 20% discount is proposed" "(versus a deeper 30% discount)") and Intuitive-00104186 ("The discount would be applied to participating instruments whether the customers is shipped refurbished or new instruments.").

entrants,[835] and these internal Intuitive proposals were never implemented,[836] but they provide a reliable benchmark of the sort of discounts Intuitive would have offered if it had faced effective rival EndoWrist repair competition in a but-for world without the anticompetitive restraints.

2. Yardstick for Intuitive Prices—Rival MIST Surgery Robot Instrument Prices

353. One yardstick with which to compare the price of EndoWrists is the price of instruments used with other MIST surgery robots. "[A] recent internal review by our local healthcare system revealed an average instrument cost of $3,400 per da Vinci procedure, which is significantly higher than the projected $800–1,600 instrument costs for Senhance."[837] A 2018 PiperJaffray report found that Senhance had a per procedure cost "roughly half of what ISRG [Intuitive] charges" and the low per-procedure pricing was "mainly driven by reusable instruments with minimal disposables per case."[838] These much lower per-procedure prices for rival MIST surgery instruments indicate that the competitive price for EndoWrists was inflated by the anticompetitive restraints.

3. Benchmark for Third-Party IRC Prices and Penetration

354. One way in which hospitals were overcharged was by being forced to purchase new EndoWrist replacements from Intuitive instead of lower-cost EndoWrist repair. Rivals planned to or did offer EndoWrist repair at discounts up to half the price of a new EndoWrist, as described below.

355. Before addressing the discounts of actual repaired EndoWrist prices relative to actual new EndoWrist prices, I address the advertised discounting of list prices for repaired EndoWrists relative to new EndoWrists. Rebotix's advertised that its repaired EndoWrists would provide an average savings of 45 percent or more compared to Intuitive EndoWrists based on a comparison Rebotix's list price to Intuitive's list price.[839] Restore offered repaired EndoWrists at a discount of 23-30%

[835] *See supra* Table 2 and Section IV.B.
[836] *See, e.g., supra* Section VI.A.4.
[837] Perez & Schwaitzberg (2019) at p. 6.
[838] Intuitive-00364420-444 at 423; Intuitive Form 10-K FY2020 ("We sell various accessory products, which are used in conjunction with the da Vinci Surgical Systems as surgical procedures are performed. Accessory products include…vision products, such as replacement 3D stereo endoscopes.").
[839] Papit (in *Rebotix*) 30(b)(6) Dep. at 179:10-16; Papit (in *Rebotix*) 30(b)(6) Dep. Ex. 8 at REBOTIX068496.

off Intuitive's list price.[840] Glenn Papit, co-founder of Rebotix, indicated that they arrived at their list prices based on hospitals anticipating a savings of 40 to 50 percent off of the list price.[841]

356. These advertised price discounts in terms of repaired EndoWrist list price relative to new EndoWrist list price were consistent with discounts in terms of actual prices paid. The average price offered by actual entrants Restore, SIS, and Rebotix for a repaired EndoWrist was a 45% discount relative to the price Intuitive Surgical actually charged for new EndoWrists. See Table 3 below.

Table 3: Actual Average Price of Repaired EndoWrists vs. Intuitive Replacement EndoWrists[842]

EndoWrist	Intuitive Price	Average Repair Price	Average Repair Discount
LARGE NEEDLE DRIVER	$2,202	$1,168	47%
DEBAKEY FORCEPS	$1,869	$1,100	41%
CADIERE FORCEPS	$2,010	$1,224	39%
PROGRASP FORCEPS	$2,202	$1,260	43%
PRECISE BIPOLAR FORCEPS	$2,705	$1,292	52%
MARYLAND BIPOLAR FORCEPS	$2,709	$1,315	51%
MONOPOLAR CURVED SCISSORS	$3,202	$1,643	49%
PERMANENT CAUTERY HOOK	$2,013	$1,001	50%
PERMANENT CAUTERY SPATULA	$2,016	$1,050	48%
DOUBLE FENESTRATED GRASPER	$2,033	$1,100	46%
COBRA GRASPER	$2,204	$900	59%
MEGA NEEDLE DRIVER	$2,207	$1,399	37%
FENESTRATED BIPOLAR FORCEPS	$2,705	$1,698	37%
TENACULUM FORCEPS	$2,272	$1,300	43%
PK DISSECTING FORCEPS	$2,904	$1,561	46%
MEGASUTURECUT NEEDLE DRIVER	$2,412	$1,256	48%
SMALL GRASPING RETRACTOR	$2,429	$1,300	46%
VOLUME-WEIGHTED AVERAGE			45%

357. The lower price of EndoWrist repair would, absent Intuitive's exclusionary restraints, result in some portion of the market using repaired EndoWrists instead of buying replacement EndoWrists. Different sources

[840] Restore-00009348-359 at 355; Intuitive-00207932, Intuitive-00207933.
[841] Papit (in *Rebotix*) 30(b)(6) Dep. at 37:7-10, 179:17-181:4.
[842] Source: Intuitive Instrument & Accessory Transaction Data, REBOTIX175326, Restore-00055938, Restore-00055935, Restore-00055937, SIS000167, SIS000171.

considered penetration rates up to 50%. At the low end, one Intuitive presentation indicated that "[m]arket data shows that remanufacturing is only 5% of a given market segment."[843] An Intuitive presentation from 2017 noted that the "best parallel" to repaired EndoWrist was a certain type of laparoscopic instrument for which share of reprocessed units was 10% and "expected to grow to 15% in the next 10 years."[844] One Intuitive internal analysis was that penetration of repaired EndoWrists would start at 11% and grow to 14% over the course of five years. [845] Intuitive also had internal analysis showing that if it offered repaired EndoWrists, 20% of its EndoWrist sales would be repaired EndoWrists,[846] and it also modeled penetration rates of 33 to 50%.[847] A Deutsche Bank report had a base case scenario in which it estimated that, even with the challenged restraints on rival repairs, repaired EndoWrists would take a 15% share and its author thought the penetration rate would be higher without the challenged restraints.[848] Stryker projected that their EndoWrist repair share of the market could grow from 2% in 2017 to 8.5% in 2020.[849]

C. Direct Evidence of Use Limits Being Suppressed

358. There are two separate reasons why Intuitive's use limit on EndoWrists would be higher absent the allegedly exclusionary restraints. (Each reason provides separate evidence of anticompetitive impact.) First, because the use limit is itself an anticompetitive restraint that would not exist in the but-for world. Second, because without the restraints on rival competition for repaired EndoWrists, competition with repaired EndoWrists would have driven Intuitive to set a higher use limit, as its extended use program suggests.

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[843] DeSantis (in *Rebotix*) Dep. Ex. 38 at Intuitive-002373269.

[844] Scoville (in *Restore*) Dep. Ex. 1 at Intuitive-00104191 ("As I mentioned earlier, the reprocessed, SUD market is the closest parallel. Further the reprocessed, lap, direct energy market is best parallel within that market." "Today 10% of the lap energy units sold to end users are from a reprocessed company like SSS [Stryker Sustainability Solutions] or sterilmed. This number is expected to grow to 15% in the next 1 years. Interestingly, in recent years these companies have pursued chips similar to ours to prevent refurbishing and still. The market has grown. We should take note of this.").

[845] Intuitive-00104952 (grow from 11% in 2018 to 14% in 2024).

[846] Bair (in *Rebotix*) Dep. at 81:12-82:4, Ex. 10.

[847] Intuitive-00581814-883 at 858, 860, 868, 871, 877, and 879.

[848] DeSantis (in *Rebotix*) Dep. Ex. 11 at Intuitive-00566073 (this was based on a "5% de novo unit share…and the assumption that each instrument is repaired 3x." This was within a range of de novo unit share that was described as "reasonable and potentially even conservative."); Zafar (in *In re: da Vinci*) Dep. at 106:16-109:22.

[849] STRREB00001810.

1. Evidence That Use Limits Would Not Have Existed in The But-for World

359. It is my understanding that plaintiff expert Dr. Eugene Rubach will testify that the EndoWrist use limits imposed by Intuitive were arbitrary and unnecessary.[850] This is corroborated by the evidence I have reviewed. As Intuitive internally acknowledges, the "FDA does not require nor limit the number of uses for our EndoWrist instruments."[851] The unreasonableness of these Intuitive-imposed hard use limits is demonstrated by other surgical instruments and accessories with no use limits. For example, traditional laparoscopic instruments can be repaired and re-used "over and over",[852] yet they have been described as having "very, very similar" materials and components to EndoWrists.[853] Other MIST surgery robots are compatible with instruments that do not have use limits. For example, Senhance-compatible instruments are "fully reusable" and "do[] not have a limited lifespan."[854] Intuitive even offers accessories for the da Vinci which do not have use limits, such as the endoscope used by the surgeon to see inside the patient and guide the EndoWrists.[855]

2. Intuitive's Extended Use Program

360. Traditionally, Intuitive had imposed a use limit of ten uses on all but a handful of EndoWrists.[856] When competitive pressures finally pushed Intuitive to

[850] Expert Report of Dr. Eugene Rubach, 12/1/2022, §VI.
[851] Bair (in *Rebotix*) Dep. Ex. 19 at Intuitive-00214231.
[852] Harrich (in *Rebotix*) Dep. at 32:16-20 ("Q. … Does your hospital repair and use over and over traditional laparoscopic instruments, scissors, forceps? A. Yes, we do."), 34:2-7 ("Q. Based on the hospitals you know, it is standard procedure to repair and reuse traditional laparoscopic devices that are similar to the EndoWrist used in da Vinci surgeries; is that right? . . . THE WITNESS: That's correct.").
[853] Posdal (in *Restore*) Dep. at 12:17-13:18.
[854] TransEnterix, *Fact Sheet: Senhance Surgical System Highlights*, available at https://asensus.com/sites/default/files/media-kit/TRX%20fact%20sheet_2018_u.pdf; Elizabeth Cairns, *Intuitive finally gets some US competition*, EVALUATE, October 16, 2017. Available at https://www.evaluate.com/vantage/articles/news/intuitive-finally-gets-some-us-competition (TransEnterix's Senhance robot "does not have a limited lifespan with instruments being replaced as determined by the surgeon" and "can be reused thousands of times."); Longmore et al. at p. 16; Intuitive-00113298-299 at 299 ("There was concern on [Intuitive] pricing. Especially with TransEnterix offering unlimited life instruments.").
[855] *See*, e.g., Intuitive-00000105-128 at 115 (no use limit listed in product catalog, unlike other products).
[856] *See*, e.g., DeSantis (in *Rebotix*) Dep. at 171:11-13 ("Q…The Si instruments, they were typically initially set at ten lives; right? A Yes."). Zafar (in *In re: da Vinci*) Dep. Ex. 2 at Restore-00002860;

consider whether its use limits could be extended,[857] Intuitive's staff initial "guess" was that its EndoWrist instruments could be used about 20 times, with some in the mid-20s, some in the low 20s, and some in the high teens.[858] In a separate analysis regarding reprocessing, Intuitive noted that "[h]istorically our resposable instruments get tested to nearly 30 use cycles ...."[859] However, instead of doubling or tripling the use limits Intuitive merely increased the use limit of some select EndoWrist models by 20-80%. See Table 4 below.

Intuitive-00360827 (da Vinci Xi instrument & accessory catalog, May 2016); Intuitive-00000129 (da Vinci Si instrument & accessory catalog, March 2020). There were a handful of exceptions to this, such as Black Diamond Micro Forceps with 15 uses. Intuitive-00360827-850 at 833.

[857] Intuitive-00333561-572 at 563 (the program "[f]urther defends price position from competitive entry"). At that time, the most recent competitive entry was not rival MIST surgery robots but rather third party repaired EndoWrists (e.g., Senhance and Flex both were FDA-approved by 2017 while the first sale of third party repaired EndoWrists was in July 2018. *See* Vavoso (in Rebotix) Dep. at 85:20-86:3; Khandalavala et al. (2020) at 9; Koukourikis & Rha (2021) at 16; Press Release, *TransEnterix Announces US 510(k) FDA Clearance for Senhance Surgical Robot System*, October 13, 2017, available at https://ir.asensus.com/news-releases/news-release-details/transenterix-announces-us-510k-fda-clearance-senhance-surgical (accessed 7/26/2022).; Restore-00055937 (first sale by Restore in 7/2018).

[858] Intuitive-00337917-920 at 917 (email from Nicky Goodson at Intuitive with subject "RE: Extended life project": "My guess" for lives until "the instruments completely fail[]" is "Prograsp, Cadiere: mid-20's", "MSCND: low 20's", and "FBF & LND – high teens"). These are all types of EndoWrists (see, e.g., product catalog Intuitive-00000105-128). These figures are all much higher than the prior use limits of 10 for the EndoWrist models prograsp forceps, cadiere forceps, mega suture cut needle driver (MSCND), fenestrated bipolar forceps (FBF), and large needle driver (LND). *See* Intuitive-00000105-128 at 108, 109.

[859] Intuitive-00621811-814 at 813. Intuitive's own testing of one type of EndoWrist found an average life of over 26 (unrepaired) uses, even though it imposed a use limit of 10. Intuitive-00481167-175 at 172.

Table 4: Use Limit Increases Through the Extended Use Program[860]

EndoWrist	Before	After	Percent Increase
	(1)	*(2)*	*(3)=(2)/(1)-1*
Large Needle Driver	10	15	50%
Long Tip Forceps	10	18	80%
Cadiere Forceps	10	18	80%
Prograsp Forceps	10	18	80%
Micro Bipolar Forceps	10	14	40%
Maryland Bipolar Forceps	10	14	40%
Cobra Grasper	10	18	80%
Fenestrated Bipolar Forceps	10	14	40%
Large Suturecut Needle Driver	10	15	50%
Mega Suturecut Nd	10	15	50%
Curved Bipolar Dissector	10	14	40%
Long Bipolar Grasper	10	14	40%
Force Bipolar	10	12	20%

361. Intuitive's conduct in the actual world would have been influenced by its ability to use exclusionary restraints to foreclose competition. Economic theory tells us that lower competitive pressure allows firms to take actions which extract more profit, such as by raising prices or artificially lowering use limits. Absent Intuitive's exclusionary conduct, which foreclosed rival repair companies and the competitive pressure they created, it is reasonable to expect that Intuitive would have taken more significant action with regard to use limits. A natural starting point would be raising them to the 30 use cycles to which they were historically tested or at least the 20 plus uses that Intuitive staff guessed was usually possible.[861] Indeed, Intuitive had experience developing EndoWrists with a use limit of 30 without repair—the training EndoWrists.[862] One Intuitive analysis even contemplated use limits of 40 to 100.[863]

362. There are also reasons to conclude that the extended use program that was implemented for some select models could have been implemented earlier. In the process of bringing to market the extended-use versions, Intuitive determined that "[e]xtending the number of lives does not involve any changes to the intended use(s) or instrument design."[864] Intuitive's internal analysis indicates that "[t]he

[860] Source: Intuitive Instrument & Accessory Transaction Data.
[861] Intuitive-00621811-814 at 813.
[862] Intuitive-00667503-537 at 529.
[863] Intuitive-01190868 ("EUI [Extended Use Instrument] of 40-100 lives").
[864] DeSantis (in *Rebotix*) Ex. 18 at Intuitive-00552635.

ability to extend lives can be attributed to many factors, including…steps taken to validate the safety of extended lives."[865] Bob DeSantis of Intuitive indicated that Intuitive simply did not take those steps earlier for the X/Xi-compatible EndoWrists, and never tested S/Si-compatible EndoWrists for extended use.[866] Delayed or reduced competitive effort is an example of the "quiet life" enjoyed by monopolists who do not face close competition.[867]

3. Other Evidence on Use Limits Being Suppressed

363. Other sources of information from IRCs, hospitals, and third parties suggest that Intuitive's use limits suppressed EndoWrist usage below the but-for levels that would have prevailed without its anticompetitive restraints on usage. The FDA recently gave 510(k) clearance for EndoWrists to be used beyond the limit imposed by Intuitive.[868] Steve Harvey, chief nursing officer at Crescent City Surgical Centre, stated his institution conducted their own review of the evidence and "find no indication that the functionality of robotic instruments is compromised when re-using the instruments beyond the limited number of times suggested by

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[865] Intuitive-00004692-704 at 704.

[866] For example, Intuitive's white paper documenting its analysis of whether instruments lives could be safely extended was only performed on X/Xi instruments (Intuitive-000004692-704 at 692). *See also*, DeSantis (in *Rebotix*) Dep. at 210:6-8, 171:18-22 ("And, for example, in 2012, you could have tested the instruments and seen, Hey, are we seeing a higher number of uses that we can get out of them, right, using our life testing? A We could have, yes."), 172:15-22 ("Q Well, you could certainly have tested the Si instruments in 2013 to determine whether additional lives were warranted; right? A We could have, yes. Q Did Intuitive, in fact, do any such testing? A I don't know. Q Are you aware of any? A not off the top of my head.").

[867] J.R. Hicks, *Annual Survey of Economic Theory: The Theory of Monopoly*, ECONOMETRICA, Vol. 3(1), Jan. 1935, 1-20 at 8 ("The best of all monopoly profits is a quiet life").

[868] Letter from U.S. FDA to Rick Ferreira at Iconocare Health Re: K210479 dated 11/15/2022, available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf (with attached FDA letter dated 9/30/2022 indicating "We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce….You may, therefore, market the device, subject to the general controls provisions of the Act."); May Dep. at 79:20-22 ("Q. Does Restore currently have the 510(k) – 510(k) clearance for EndoWrist remanufacturing? A. We have 510(k) for the 420179 EndoWrist."); *id*. at 86:2-11 ("THE WITNESS: Yes. But also, we believe that you don't have to get a 510(k) on some of the other devices. So in the past, we have – we have done what's called a 'family' or 'expansion of the family.' And so, you have – you have a 510(k) for the most difficult device. And then you do what's called a 'letter to file.' And you – you're able to do the remanufacturing or the manufacturing on these similar or equivalent devices without going through the 510(k) process.").

Intuitive Surgical."[869] Glenn Papit of Rebotix testified, "We have validated testing up to 29 times. We have not done past 20 [i.e., two resets] in our brief presence in the marketplace due to interference [from Intuitive] that precedes this discussion," but that might "mean 29 times in addition to the original 10,"[870] which would come to 39 total uses. Elsewhere, Papit concluded that Rebotix had successfully reset EndoWrists up to four times and that four to five times was realistic.[871] Given a typical use limit of 10 and the fact that the Rebotix system required the initial reset of an EndoWrist to occur while it had at least one use remaining (while subsequent ones could occur when it was at zero), this indicates that 49 to 59 uses were realistic.[872] Similarly, Deutsche Bank concluded that EndoWrists were "typically repairable up to four times," which given the same logic implies 49 uses, but then in its analysis Deutsche Bank adopted the conservative "assumption that each instrument is repaired 3x," which given the same typical use limit of 10, implies 39 total uses.[873]

D. Direct Evidence of Higher da Vinci Servicing Prices and Lower Output

364. I have already shown that, in a but-for world without Intuitive's use of exclusionary restraints, there would be more rival competition in the da Vinci servicing market. I have also shown that economic theory predicts that additional competition will result in lower incumbent prices. There are also several sources of evidence that I present here to show how hospitals would have paid lower prices for da Vinci servicing in the but-for world. These higher prices were a barrier to more widespread use,[874] which indicates they were reducing output.[875]

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[869] Bair (in *Rebotix*) Dep. Ex. 20 at Intuitive-00214563 ("We have audited the quality system and testing protocols of our robotics instrument repair partner [Restore] as well as several independent reports about material degradation, and we find no indication that the functionality of robotic instruments is compromised when re-using the instruments beyond the limited number of times suggested by Intuitive Surgical.").

[870] Papit 30(b)(6) (in *Rebotix*) Dep. at 74:15-75:8.

[871] Papit 30(b)(6) (in *Rebotix*) Dep. at 78:10-80:16 & Ex. 3.

[872] *See* STRREB00000322-323 at 322 (stating that for Rebotix's method of resetting the usage counter, "The first reset must have one use remaining. It is reset to 10. Following that first reset, the instrument can be 0 and be reset. Therefore, you get 9 with the first reset and 10 with each subsequent reset.")

[873] Intuitive-00552993-3014 at -2993 & -3007.

[874] Intuitive-00261446.

[875] *See* discussion of Panama City (Florida) Surgical Center in Section VI.A.1 above.

1. Direct Evidence on Rival Prices for da Vinci Servicing

365. Direct evidence that hospitals paid Intuitive inflated prices for da Vinci servicing can be found by comparing the prices Intuitive charged for such servicing to those offered by Restore for da Vinci servicing. While Intuitive charged $995 an hour for da Vinci servicing, Restore offered an on-site servicing rate of $3,500 per day.[876] Restore gave a verbal quote of "under $7,000" to repair a da Vinci vision cart that was "about $20,000 less than Intuitive quoted," a 74% discount.[877]

2. Other Medical Service Market Yardsticks for Intuitive da Vinci Servicing Prices

366. One yardstick is to compare Intuitive's da Vinci servicing margins with the margins for service of other medical devices. IBISWorld, an industry research firm, estimates the profit margins for the medical device service market.[878] The profit margin it reports is earnings before interest and taxes ("EBIT") divided by revenue. The average EBIT profit margin for medical equipment repair and maintenance services was 8% in 2021.[879] The firm closest to Intuitive in size was

[876] Intuitive-00154125; Restore-00002260-265 at 262.

[877] Wasfy (in *Restore*) Dep. 20:16-21 ("They are explaining the robot issue, that we have called Restore and the invoice to repair specific -- I cannot remember exactly what the device was or the instrument, it was $7,000 and that's about $20,000 less than they had quoted from Intuitive.") & Ex. 4 at AHS_MGMT-INTUITIVE_0000189. Given that Restore's quote was $7,000 and that was $20,000 less than Intuitive quote, then Intuitive's quote was $27,000. Thus, Restore's discount was thus $20k/$27k = 74% off Intuitive's quote.

[878] IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 12 (e.g., "profit (measured as earnings before interest and taxes) is expected to account for 8.2% of industry revenue."); IBISWorld, *About Us*, https://www.ibisworld.com/company/our-story/ (accessed 11/10/2022).

[879] IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 23.

Abbott.[880] Abbott had an EBIT profit margin on servicing of 24% in 2021.[881] It appears that Intuitive does not report EBIT profit margins just for service, but it does report gross margins for service, which averaged 87% over 2017-2020.[882] Intuitive's ratio of EBIT to gross margin for all products and services (the most granular level of detail it provides for EBIT) was 0.48 in 2021.[883] I therefore approximate Intuitive's EBIT profit margin for service by multiplying its gross margin for service by this ratio, arriving at a value of 42%.[884] This is likely a conservatively low estimate since Intuitive's contribution margin for da Vinci servicing was significantly higher than its contribution margin for da Vinci robots or instruments and accessories.[885] Even with this conservative estimate, this 42% is nearly double Abbot's EBIT profit margin and over five times the average EBIT profit margin for medical equipment repair and maintenance services.

367. Alternatively, given the data produced by Intuitive and available from IBISWorld, one could attempt to compare profit margins after removing just direct costs. Intuitive calls the profit margin after accounting for direct labor, direct

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[880] Abbott shares other similarities with Intuitive, including being a leading medical device OEM (Statista, Leading Companies Based on Medical Device Revenue in 2021, https://www.statista.com/statistics/257473/revenue-of-global-top-medical-technology-companies-2015/ (accessed 11/19/2022); Abbott Form 10-K FY2021 at 15 (Abbott has 27 manufacturing sites for medical devices), 28 (billions of dollars in medical device sales annually)). Abbott is the OEM of the EnSite Cardiac Mapping System, whose user manual specifies maintenance involving tests which "require specialized equipment and training. Contact an EnSite…Cardiac Mapping System-trained field service representative" (*EnSite Precision Cardiac Mapping System Model EE3000: Instructions for Use U.S. Edition v2.6* at 262, *EnSite Velocity Cardiac Mapping System Model EE3000: Instructions for Use U.S. Edition v5.2* at 237, both available at https://manuals.sjm.com/Search-Form?re=North-America&cc=US&ln=EN&ct=professional&qry=Ensite&ipp=10&Page=1).

[881] IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 29. Abbott's 2021 revenue in this category was $454 million.

[882] Intuitive-00595405. These were the latest four years provided.

[883] $1,890.3 / $3,958.5 = 0.48 (Intuitive Surgical Form 10-K FY2021 at 84).

[884] 87% x 48% = 42%. Implicit in this calculation is the assumption that the following cost categories should be assigned to service based on service's share of gross profit: amortization of intangible assets; research and development; selling, general and administrative; and various other costs. Intuitive Surgical Form 10-K FY2021 at 68, 84, 87.

[885] *Compare supra* Section II.G.2 (da Vinci servicing contribution margins were 82-84%), *with supra* Sections II.C.2 and II.E.2 (contribution margins were 60-67% for da Vinci robots and 72-75% for instruments and accessories).

material, and other transaction-related costs the contribution margin.[886] The closest parallel in the IBISWorld data would be calculating a profit margin that accounts for just "wages" and "purchases."[887] This is likely to be a conservative comparison, because the "wages" and "purchases" are not necessarily restricted to direct labor and materials and do not necessarily capture the other transaction-related costs used by Intuitive.[888] The average profit margin of medical equipment repair and maintenance services, accounting for just wages and purchasing, was 43%.[889] Intuitive's average contribution margin for da Vinci service was 83%, which is nearly double the (likely conservative) yardstick just described.[890]

368. One issue to consider in evaluating yardsticks for da Vinci service prices is the fact that Intuitive had proprietary tools which meant some services could be performed only by Intuitive.[891] However, that is also generally true for the above yardsticks because "OEMs have generally been unwilling to share servicing and maintenance procedures, methodologies, tools, training, parts and documentation (collectively, the 'Materials') with End Users."[892] The difference in profit margins

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[886] Marshall Mohr, former CFO of Rebotix, testified that Intuitive's "contribution margin incorporates direct labor direct material and…a few other costs" which "are things that only occur if there is a sale." M. Mohr (in *In re: da Vinci*) Dep. at 9:23-10:10, 34:1-5.

[887] IBISWorld reports cost categories of wages, purchases, marketing, depreciation, rent, utilities, and other costs (includes legal fees, R&D, and employee training costs). IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 23-25.

[888] The other costs Intuitive accounts for when calculating contribution margin include items such as obsolescence, freight and packaging, commissions, and training (Intuitive-00595405).

[889] 100% – [wages as a percent of revenue] – [purchasing as a percent of revenue] = 100% - 29.7% - 27.1% = 43.2%. The IBISWorld report does not report these categories separately by company, so I was unable to perform this calculation for Abbott.

[890] 83% / 43% = 1.93.

[891] *Supra* Section V.D.3; Defendant Intuitive Surgical, Inc.'s Answer and Affirmative Defense, January 18, 2022, Answer ¶ 64 ("Intuitive admits that its proprietary service software is necessary to perform preventative maintenance and to repair the da Vinci.").

[892] Alliance for Quality Medical Device Servicing, *Submission to FTC Re: Comment to the FTC on "Nixing the Fix" Workshop*, September 13th, 2019, available at https://deviceservicingalliance.com/wp-content/uploads/2020/06/The-Alliance-for-Quality-Medical-Device-Servicing-FTC-Response-on-Right-to-Repair-13Sep2019.pdf ("A concern that has existed since the Quality System Regulation ('QSR') rule was proposed in 1993 is that OEMs have generally been unwilling to share servicing and maintenance procedures, methodologies, tools, training, parts and documentation (collectively, the 'Materials') with End Users. In fact, the 2013 CMS Memorandum on servicing and maintenance acknowledged in part that 'Hospitals may find that manufacturer's recommendations for some equipment are not available to them or their contractors.'"). *See also*, International Association of Medical Equipment Remarketers &

is thus unlikely to reflect the existence of proprietary tools, which exist both in this service market and the yardstick service markets, but rather likely reflects the extensive anticompetitive restraints imposed by Intuitive on the da Vinci service market.

E. Intuitive Would Not Have Achieved the Same Effect by Raising Robot Prices in Response to Lower EndoWrist or da Vinci Servicing Prices

369. I understand that Intuitive has argued that, even in a but-for world without its exclusionary restraints where it lowered its EndoWrist prices, it would have simply raised its da Vinci prices and achieved the same "effect" in terms of customers paying as much money.[893] This type of argument is what economists call the "Single Monopoly Profit" theory, under which a tying monopolist claims that any elevated pricing on its tied product (here, replacement EndoWrists or da Vinci servicing) could have instead been achieved through elevated pricing on the tying product (here, the da Vinci robot), so in the but-for world customers would have paid the same total amount for the tying and tied products as they paid in the actual world.

370. However, the Single Monopoly Profit argument requires five necessary conditions, and at least the following three are not met: (1) a fixed ratio in the use of the tying and tied product, (2) a fixed competitiveness of the tied market, and (3) a fixed competitiveness of the tying market.[894]

Servicers (IAMERS), *Submission to FTC Re: Nixing the Fix: Workshop on Repair Restrictions*, April 30, 2019, available at https://www.regulations.gov/document/FTC-2019-0013-0026 ("IAMERS members have expressed concerns to IAMERS with regard to access to obtaining adequate repair information for diagnostic imaging equipment. IAMERS members have sought repair information from manufacturers for the equipment they service including equipment manuals, service keys and training. Cooperation in this regard is inconsistent.").

[893] Intuitive Surgical Inc.'s Dispositive Motion for Summary Judgment, dated 11/17/2021, at 18, 36-37, *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, Civil Case No. 8:20-cv-2274-VMC-TGW (M.D. Fla.).

[894] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 464-472 (4th ed. 2022); Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 404-420 (2009) (hereinafter, "Elhauge (2009)").

1. Without a Fixed Ratio Between Purchases of the da Vinci Robot and Purchases of Both EndoWrists and da Vinci Servicing, the Single Monopoly Profit Theory Fails

371. The single monopoly profit theory relies on the assumption that "[b]uyers do not use varying amounts of the tied product with the tying product."[895] Applied to the facts of this case, this is an assumption that each hospital has the same, fixed ratio of EndoWrists purchases to robot purchases and same fixed ratio of da Vinci servicing to robot purchases, for each da Vinci robot that it owns.

372. This fixed-ratio assumption clearly does not hold. Different hospitals do different numbers and types of surgeries.[896] Even within a given type of surgery, a variety of number and types of EndoWrists may be used.[897] This results in a variable ratio of both EndoWrists and service per da Vinci robot. As Intuitive's expert Dr. Loren Smith indicated, "different hospital systems are going to require different numbers of instruments to meet their surgical needs."[898] As for da Vinci servicing, demand varies with intensity of use and different hospitals can have different policies about the extent to which they are willing to pay for expensive service to extend the life of da Vinci machines, and as a result Intuitive offered varying levels of da Vinci service that hospitals could choose.[899]

2. The Possibility of Increased Competition in EndoWrist Repair and Replacement and da Vinci Servicing Means the Single Monopoly Profit Theory Fails

373. As I have noted, "[t]he single monopoly product theory also assumes that the tied market is perfectly competitive in a way that tying cannot alter."[900] The two tied markets in this case (EndoWrist repair and replacement and da Vinci service) were far from perfectly competitive. Instead, both these markets have had

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[895] Elhauge (2009) at 400.

[896] *See*, e.g., Intuitive-00895698-738 at 715 ("Example: Orlando Regional Hospital" mix of procedures), 720 ("Example: Memorial Sloan Kettering Cancer Center" mix of procedures).

[897] *See*, e.g., Intuitive-00143958-990 at 979-980.

[898] Smith (in *Rebotix*) Dep. at 243:8-15.

[899] *See* Intuitive-00099416-463 at 452 (offering several different levels of servicing: essential, partnership, complete and premium); Morales 30(b)(1) Dep. at 50:3-11 ("Q Okay. So my understanding, then, is that a hospital could purchase a package that would have some of these services, some packages had all of them, some packages had fewer; is that correct? […] THE WITNESS: Yes, each package had a – had different features and benefits, it really was up to the hospital to determine which one was best for them.").

[900] Elhauge (2009) at 413.

a dominant firm that prices well above its costs and that has at most had a limited number of rivals who were restrained to a minor market share before they were driven out of the market. The level of competition would have been much higher without the challenged restraints, but in fact competition was completely restrained.

374. The single monopoly profit theory requires that the tie create no change in tied market competitiveness, but such change is exactly what would have happened here in the but-for world. "If the tied market is not perfectly competitive, then tying that forecloses a substantial share of the tied market can reduce rival competitiveness by impairing rival efficiency, entry, existence, aggressiveness, or expandability. Any one of these adverse effects on rival competitiveness can in turn anticompetitively increase the tying firm's market power in the tied market, thus raising prices and harming consumers."[901]

3. The Possibility of Increased Competition in the Market for MIST Surgery Robots Means the Single Monopoly Profit Theory Fails

375. The single monopoly profit theory also relies on the assumption of "fixed tying market competitiveness."[902] If this assumption does not hold, "then tying can create additional anticompetitive effects by making the degree of tying power higher than it would have been without tying."[903] That applies to this case because servicing da Vincis is a partial substitute for buying new da Vincis in the sense that the more servicing one buys, the less one needs to buy a new da Vinci. Thus, lower servicing prices would predictably mean more servicing, longer-lasting da Vincis, and lower prices for new da Vincis.

F. There Are No Countervailing Procompetitive Justifications for Intuitive's Exclusionary Restraints

376. Intuitive has argued in its responses to contention interrogatories that there were procompetitive justifications for its exclusionary restraints.[904] I address

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[901] EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 468 (4th ed. 2022).
[902] Elhauge (2009) at 397.
[903] Elhauge (2009) at 417.
[904] Intuitive's Responses and Objections to Plaintiffs' First Set of Contention Interrogatories, at No. 6 (Intuitive's response is that "any restrictions on remanufacturing of EndoWrists and da Vinci service are justified by rationales that are procompetitive, including Intuitive's legitimate patient safety, product quality, and reputational concerns; avoiding potential liability and/or unwarranted

each of these offered justifications, and I find that none of them have economic merit.

377. Before analyzing specific justifications, it is useful to clarify that the issue is not that Intuitive simply offers a bundle of products and services that customers can take if they wish. The issue is that for certain products and services Intuitive excludes rival firms by insisting that buyers take the tied products only from Intuitive if they want to get the tying products. Any allegedly procompetitive justification must explain why such a restraint is reasonably necessary to advance that justification.

378. ***Transaction Costs.*** The above clarification is important for assessing Intuitive's claim that its exclusionary ties reduce customer transactions costs. This justification might make sense if we were comparing the world with the bundle to a but-for world where the products could never both be bought from the same company. Such is not the case here. In a but-for world without the tying restraint, Intuitive would offer both the tying and tied products separately, and any hospitals that wanted to avoid the "transaction costs" of using rival IRCs could simply have chosen to purchase both products from Intuitive. Instead, Intuitive removed that option for them by requiring that hospitals buy both the tying and tied products from Intuitive even if they would prefer otherwise. To put it another way, the alleged procompetitive justification fails because the challenged restraint is not the willingness to sell both the tying and tied product to buyers, but rather the challenged restraint is insisting that any purchasers of the tying product must take the tied product from Intuitive. That challenged restraint has bite to the extent that buyers would ***not*** otherwise take both products from Intuitive and thus affects buyers who do ***not*** experience enough transaction cost benefits from taking both products from Intuitive to offset the disadvantages of doing so.

379. Nor have I seen any evidence that the exclusion of rival IRCs has benefitted hospitals by reducing transaction costs, let alone that it has reduced overall costs to hospitals. Quite to the contrary, the evidence is that the restraints have imposed higher costs on hospitals. See discussion of anticompetitive harm in Sections VI.A-D above and damage calculation in Part VII below.

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litigation as a result of third parties' incompetent, dangerous, and/or illegal activity; avoiding free-riding and promoting innovation; offering customers superior financial terms; lowering transaction costs for consumers, and reducing compatibility costs.").

380. ***Safety/Quality.*** Another alleged procompetitive justification is that excluding third party repair and servicing improves patient safety/product quality. But that justification is undermined by plaintiff expert Ms. Kim Trautman's conclusion that third-party IRCs, in general, do not represent any safety/quality issues.[905] Her conclusion is confirmed by other evidence that I have reviewed. In the first place, Intuitive itself concluded that repaired EndoWrists were as good as or better than new EndoWrists.[906] Rival EndoWrist repairs were well-regarded as safe and dependable.[907] Pullman Regional Hospital's director of surgical services, Edward Harrich, conducted a trial of "Rebotix-repaired EndoWrists" and found that "There was no difference than the non-reprocessed instruments."[908] Likewise, Conway Regional Medical Center's director of surgical services, Tyler McDonald, conducted a trial and found that surgeons "couldn't tell any difference between [Restore-repaired EndoWrists] and the other instruments that came directly from Intuitive.").[909] Moreover, if the restraints were motivated by safety/quality issues, one would have expected Intuitive to have done testing to determine that rival-repaired EndoWrists had performance issues before imposing the restraints, but in fact it did not do so.[910]

381. Further, any analysis of supposed safety/quality issues needs to be taken relative to Intuitive's own failure rates. Intuitive EndoWrists had over a hundred reports of adverse events versus none for IRC repaired EndoWrists.[911] Nor do any

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[905] Expert Report of Kimberly A. Trautman, M.S., 12/1/2022 ("Trautman Report"), at § VIII. *See also id.* at § VII.C, VII.D.

[906] Intuitive-00103456-478 at 448-459, 466 (it was possible for repaired/refurbished instruments to be "equally capable to new", "Confirmed clinical utility [of re-manufactured RMA units] was equivalent or better than new instruments."); Scoville (in Rebotix) Dep. at 105:1-19 and Ex. 7 at Intuitive-00103429; Bair (in Rebotix) Dep. at 50:17-51:15 and Ex. 5 at Intuitive-00042946.

[907] *See* Bair (in Rebotix) Dep. Ex. 20 at Intuitive-00214563 (email from Crescent City Surgical to Intuitive: "Restore Robotics safely repairs robotic instruments after their initially recommended usage and returns the instruments to us, so we can extend their use."); Harrich (in *Rebotix*) Dep. at 36:17-20 ("Q. Would your hospital have agreed to use EndoWrists repaired by Rebotix if the repaired EndoWrists were unsafe? A. No, never."). *See also supra* Section IV.C.2.ii.

[908] Harrich (in *Rebotix*) Dep. at 36-37.

[909] McDonald (in *Restore*) Dep. at 67:22-68:15.

[910] *See* DeSantis (in *Rebotix*) Dep. at 167:5-7, 210:22-211:13 ("Q Intuitive hasn't, for example, taken an instrument that's in use by the hospital that's an instrument that's been refurbished by Rebotix and performs testing to determine whether that instrument operates appropriately during surgery; right? […] THE WITNESS: So we have not done V&V [verification and validation] or life testing on third-party remanufactured instruments, no."); Trautman Report ¶ 78 (collecting other evidence that Intuitive never tested the issue).

[911] *See* Section IV.C.2.ii.

instrument failures necessarily create any safety issue.[912] Ricardo Estape, director for HCA Florida's Institute for Gynecologic Oncology, testified that he has had Intuitive EndoWrists fail "50 times or so" during surgery, and when that has happened to him there have been no deaths or catastrophic events, and "I just tell them to change out the instrument."[913] Plaintiff expert Dr. Eugene Rubach likewise opines that "Surgeons use surgical instruments in ways that safeguard against patient harm, even in the face of instrument failure. Surgical instrument failure during surgery generally leads to replacement of the failed instrument with a working instrument, and then the continuation of the operation as planned."[914]

382. Nor am I aware of any safety/quality issues caused by a third party servicing the da Vinci. A 2018 FDA report "on the continued quality, safety, and effectiveness of medical devices with respect to servicing" did not find evidence "that would justify imposing additional/different burdensome regulatory requirements."[915] The report also noted "many OEMs and third party entities provide high quality, safe, and effective servicing of medical devices."[916]

383. If there were a genuine safety/quality issue, less restrictive methods exist, such as educating hospitals on how to evaluate the condition of used or repaired EndoWrists or the quality of rival da Vinci servicing. (See discussion in Sections IV.C.2.ii and V.D.1 above, which indicates that markets for other devices and instruments have found a way to allow third-party IRCs to compete.) After all,

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[912] Rubach Report, ¶¶ 11, 26-27.

[913] *See* Estape (in *In re: da Vinci*) Dep. at 69:1-20.

[914] Rubach Report ¶ 11. *See also id.* ¶¶ 26-27 ("Although it may seem to someone without first-hand experience performing surgery that a surgical instrument 'failure' would be a catastrophic event, it almost never is. . . . I have personally encountered several EndoWrist failures during surgery, none of which put the patient's safety at any risk. . . . Furthermore, surgeons use surgical instruments in ways such that their failure would result in minimal or no harm to the patient. . . . None of the EndoWrist failures I encountered during surgery resulted in harm to the patient. The 'failed' instrument simply was swapped out for a working one and the surgery carried on as planned.")

[915] U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/downloads/RegulatoryInformation/LawsEnforcedbyFDA/SignificantAmendmentstotheFDCAct/FDARA/UCM607469.pdf, at i. *See also, id.* at 15-l6 ("David Anbari spoke as a representative of a company who repairs surgical equipment….He emphasized that a 2016 ECRI report indicated that there is no evidence of anything other than isolated adverse outcomes arising from improper servicing, and that the continued use by hospitals and other healthcare providers ." (citation omitted)).

[916] *Id.*

in parallel markets for laparoscopic instruments without similar restraints, hospitals and surgeons routinely use repaired and/or re-used traditional laparoscopic devices.[917] Likewise, in markets for other medical equipment without similar restraints, hospitals routinely use third-party repaired medical equipment.[918]

384. Likewise, the use counter limit, which was a contractual and technological restraint on rival repair competition that reinforced the other restraints, did not appear to solve any safety issues. Dr. Eugene Rubach has opined that these use limits criteria are arbitrary and do not reflect whether the EndoWrist is suitable for clinical use and that he is unaware of any safety/quality issues that could not be solved with less restrictive means, such as the existing practice of hospital staff evaluating their instruments, as they do for laparoscopic instruments.[919] The evidence I have seen corroborates this. The use counter limits for EndoWrists have not been mandated by the FDA.[920] The Crescent City Surgical Centre stated, "We have audited the quality system and testing protocols of our robotics instrument repair partner [Restore] as well as several independent reports about material degradation, and we find no indication that the functionality of robotic instruments is compromised when re-using the instruments beyond the limited number of times suggested by Intuitive Surgical."[921] Without any manufacturer-imposed use limits, surgeons have safely operated the instruments used with both traditional laparoscopic surgical systems and rival MIST surgery robots.[922] Kyle Marks, who

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[917] *See* Harrich (in *Rebotix*) Dep. at 33:13-34:7 (In the region around Lewiston-Clarkston, it is "standard procedure to repair and reuse traditional laparoscopic devices that are similar to the EndoWrist used in da Vinci surgeries."); Donovan (in *Rebotix*) Dep. at 29:20-30:6 (It was standard procedure at Evergreen to repair reusable instruments used in traditional nonrobotic surgeries and deponent was "not aware of any" hospitals that wouldn't repair reusable, traditional laparoscopic instruments as needed.); Rubach Report ¶¶ 29, 35.

[918] IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 18 ("Services provided by independent organizations are expected to account for 24.6% of revenue [for medical equipment repair and maintenance services] in 2021." "…large imaging equipment, like MRI machines, tends to be serviced by OEMs early in their life-cycle" and hospitals "will tend to use independent operators to maintain their [older] equipment instead.").

[919] Rubach Report ¶¶ 12, 28-36.

[920] *Rebotix Repair LLC vs. Intuitive Surgical, Inc.*, 8:20-cv-02274, Rebotix's opposition to Intuitive's motion for summary judgment, Exhibit P5 (Expert Report of J. Lawrence Stevens, August 30, 2021) at ¶¶ 115-127; *see also* Trautman Report ¶ 62 (collecting evidence that Intuitive officials acknowledged that the that FDA neither requires nor limits the number of uses for the EndoWrist instruments.)

[921] Bair (in *Rebotix*) Dep. Ex. 20 at Intuitive-00214563.

[922] *Supra* Section I.A.3.ii; TransEnterix, *Fact Sheet: Senhance Surgical System Highlights*, available at https://asensus.com/sites/default/files/media-kit/TRX%20fact%20sheet_2018_u.pdf;

manages the clinical engineering program at Conway Regional Medical Center, testified that the 10-use limit "seemed rather arbitrary."[923] Edward Harrich of Pullman Hospital understood "that the reason Intuitive imposes maximum use limits on its EndoWrists is to make more money and force the hospital to buy more EndoWrists."[924]

385. ***Reputational/Liability Concerns.*** I have seen no evidence that allowing rivals to repair EndoWrists or service da Vinci robots would harm Intuitive's reputation or create any additional risk of legal liability, and there are many reasons to the contrary. Plaintiff expert Ms. Kimberly Trautman has opined that there are clear methods to determine if EndoWrist failures might be caused by third party repair,[925] which would appear to resolve any reputational or liability issues with misattributing failures to Intuitive. Further, as just noted, the evidence suggests that rival-repaired EndoWrists and rival-serviced da Vinci robots were not at greater risk of being faulty, so their usage would not create any more reputational risk or liability risk than having Intuitive supply the EndoWrist replacements or service the da Vinci robots. Indeed, the reputational and liability risk would necessarily be less because if rivals repaired EndoWrists and serviced da Vinci robots, that would increase the odds that any reputational harm and liability risk for any resulting faults in equipment would fall on those rivals, rather than on Intuitive. In contrast, because Intuitive's restraints make it the sole provider of replacement EndoWrists and da Vinci servicing, the reputational and liability risk falls on Intuitive for any faults in the equipment. Moreover, hospitals and surgeons have their own powerful reputational and liability incentives to avoid faulty EndoWrists and da Vinci robots because any resulting problems during surgery could harm hospital reputation and subject hospitals to their own liability risks.[926] In addition,

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Elizabeth Cairns, *Intuitive finally gets some US competition*, EVALUATE, October 16, 2017, available at https://www.evaluate.com/vantage/articles/news/intuitive-finally-gets-some-us-competition ("The instruments employed with Senhance can be reused thousands of times."); Longmore et al. at p. 16; Intuitive-00113298-299 at 299 ("TransEnterix offering unlimited life instruments."); Rubach Report, §VI.

[923] Marks (in *Restore*) Dep. at 6:17-7:9, 41:14-42:1; *see also*, *id.* at 46:6-14. *See also*, Posdal (in *Surgical Instrument*) 30(b)(6) Dep. at 43-44; Posdal (in *Surgical Instrument*) 30(b)(1) Dep. at 72-75.

[924] Harrich (in *Rebotix*) Deposition at 28:6-11.

[925] Expert Report of Kimberly A. Trautman, M.S., 12/1/2022, at ¶ 79.

[926] *See*, *e.g.*, Francis (in *In re: da Vinci*) Dep. at 61:8-20 ("Q. You also testified that da Vinci surgical systems are important to your practice. Why is that? A. I am known as one of the surgeons that provide the least traumatic surgeries and as some of the safest operations in this region, and that reputation is based on the way I care for patients. And part of that care is the instruments I

hospitals have powerful incentives to avoid faulty EndoWrist repairs and da Vinci servicing because such faulty repairs or servicing might damage or disable the da Vinci robot that they own, and those robots cost over $1 million each.[927] Finally, hospitals use third-party service organizations all the time, and the FDA has declared that such third party services are essential to the medical industry,[928] which suggests that such reputational and liability concerns are not strong or have been resolved by other firms in this industry with less restrictive methods.

386. ***Compatibility Costs.*** Intuitive claims that the exclusionary restraints against third party da Vinci servicing and third party EndoWrist repair reduce "compatibility costs."[929] From an economic perspective, this justification is either duplicative or meritless. The rivals that were foreclosed from the market were repairing already-compatible EndoWrists and servicing already-compatible da Vincis. To the extent that the argument is that rival repairs and servicing would cause faults that render equipment incompatible with each other, then it merely duplicates the arguments that rival repairs and service raise greater safety/quality issues or reputational/liability concerns, which were already rebutted above. To the extent there is some other compatibility cost, the justification has the same flaw as the transaction cost problem. If any compatibility cost were higher than the savings from using rival IRCs, customers would simply not use third party IRCs. The restraints thus do not help customers achieve the goal of reducing compatibility costs. Likewise, it would thus always be a less restrictive option to allow the customer to decide whether to reduce any compatibility issues by buying both tied products from Intuitive.

387. ***Free-Riding/Innovation Concerns.*** Intuitive argues that its restraints further the procompetitive justification of "avoiding free-riding and promoting innovation."[930] But the economic goals of promoting innovation by avoiding free-riding on those innovations are already addressed by patent law, which presumably

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use when I operate on patients.… Similar to a sharp scalpel or similar to any device I would use to operate. That's why it's part of my operative material.").

[927] *See*, e.g., Intuitive Surgical Form 10-K FY2020 at 67 (average sales price was $1.5 million in 2020).

[928] Third parties that "maintain, restore, refurbish, or repair a finished device after distribution" are one of the three types of entities that "play[] an essential role." U.S. Food & Drug Administration, *FDA Report on the Quality, Safety, and Effectiveness of Servicing of Medical Devices*, May 2018, available at https://www.fda.gov/media/113431/download (accessed 7/29/2022), at pp. 1-2.

[929] Intuitive's Responses and Objections to Plaintiffs' First Set of Contention Interrogatories, at No. 6.

[930] *Id.*

has set its limits on rival competition to result in the optimal patent reward and optimal investment in innovation.[931] Anticompetitive restraints that allow a firm to restrain competition and earn greater profits than would otherwise be within the rewards provided by patent law thus affirmatively undermine the efficiency of those patent protections and result in inefficient investments in innovation.[932]

388. Nor is earning a "fair" or "necessary" return on past R&D a justification for current or future exclusionary restraints that increase those returns above competitive levels. There is no reason that Intuitive "must" earn billions of dollars of profit every year based on a robot system it first developed over 20 years ago. Nor have I seen any evidence that the exclusionary restraints were necessary for Intuitive to earn a positive rate of return. To the contrary, my damages analysis indicates that Intuitive's profit margin would still have been positive and quite large without the challenged restraints.[933]

389. Note also that this justification necessarily assumes that the challenged restraints ***did*** increase prices to buyers. After all, if restraining rivals from "free riding" by providing repairs and service did not increase Intuitive's prices for EndoWrists and da Vinci servicing over but-for levels, then those restraints could not increase Intuitive's profits in a way that would encourage its investments in innovation. This procompetitive justification is thus internally inconsistent with any claim that the challenged restraints did not increase prices.

390. ***Allegedly Superior Financial Terms.*** Finally, Intuitive argues that its restraints further the procompetitive justification of "offering customers superior

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[931] Elhauge (2009) at 439-442; Elhauge & Krueger, *Solving the Patent Settlement Puzzle*, 91 TEXAS LAW REVIEW 283, 294-95 (2012).

[932] *Id.*

[933] Intuitive's actual contribution profit margin for EndoWrists is calculated to be 72-75%. *See supra* Section II.E.2. My damages analysis conservatively estimates that Intuitive's but-for EndoWrist price would be 20% less than its actual EndoWrist prices. *Infra* Section VII.A.1. Thus, assuming the low end of the contribution margin to be conservative, if .72 = (P-C)/P, where P is the actual price, then C = .28P. With the 20% discount, the but-for margin is (.8P-C)/.8P. Plugging in C = .28P, this makes Intuitive's but-for contribution margin on EndoWrists 65%.

Intuitive's actual contribution profit margin for da Vinci servicing is calculated to be 82-84%. *See supra* Section II.G.2. My damages analysis conservatively estimates that Intuitive's but-for price for da Vinci servicing would be an 24% less than its actual price. *See infra* Section VII.B. Thus, assuming the low end of the contribution margin to be conservative, if 0.82 = (P-C)/P, where P is the actual price, then C = .18P. With the 24% discount, the but-for margin is (.76P-C)/.76P. Plugging in C=.18P, this makes Intuitive's but-for contribution margin on da Vinci servicing 76%.

financial terms."[934] This argument is a non sequitur because there is no challenge in this case to Intuitive offering superior financial terms. None of the challenges interfere with any price reductions that Intuitive has offered or might want to offer. The challenge is instead to restraints that impose absolute prohibitions on buyers choosing to buy tied products from rivals, given whatever financial terms Intuitive and those rivals are offering. Such restraints prevent buyers from choosing rival products even when they conclude that the rival product offers better financial terms and equivalent quality. Further, the evidence shows that in fact the restraints have imposed far worse financial terms on hospitals.[935]

391. Moreover, the alleged procompetitive justification of offering lower prices to customers is directly opposite to Intuitive's other alleged procompetitive justification of preventing rival competition from "free-riding" in a way that reduces innovation. That latter justification necessarily assumes that by restraining rival competition, the restraints enabled Intuitive to earn ***higher*** prices that would encourage more investment in innovation. The two alleged justifications are thus entirely inconsistent with each other.

VII. PLAINTIFFS SUFFERED QUANTIFIABLE DAMAGES FROM OVERCHARGES PAID ON INTUITIVE'S ENDOWRISTS AND DA VINCI SERVICING

392. As discussed in the preceding part, the challenged restraints imposed several types of anticompetitive harm on buyers in the relevant markets: (1) higher prices and/or lower output resulting from higher prices, (2) suppressed use limits, (3) loss of buyer choice, (4) reduced innovation, and (5) higher environmental costs. Although all of these are concrete economic harms to all buyers in the markets, it is difficult to fully quantify damages for the last three harms, so in this section I conservatively calculate the damages arising from only the first two types of anticompetitive harms. The formula for these calculations applies in the same way to all members of the proposed class. Below I show the total amount of classwide damages using this method and the damages to each of the three Named Plaintiffs.

[934] Intuitive's Responses and Objections to Plaintiffs' First Set of Contention Interrogatories, at No. 6.

[935] See discussion of anticompetitive harm in Sections VI.A-D above and damage calculations in Section VII below.

A. Quantification of Damages in the Market for EndoWrist Repair and Replacement

1. Damages from the Anticompetitive Price Effect on Repaired and New EndoWrists

393. As discussed in the preceding part, without the challenged restraints, rivals would have been able to enter the market for EndoWrist repair and replacement earlier, expand more rapidly, and stay in the market. Even with the challenged restraints, the average actual price offered by entrants Restore, SIS, and Rebotix for a repaired EndoWrist was a 45% discount relative to the actual price that Intuitive Surgical charged for new EndoWrists.[936] In the but-for world, these rivals would have had incentives to price at least that low, and probably somewhat lower because they would likely gain higher economies of scale in the but-for world.

394. Because without the challenged restraints those rivals would had been able to expand and remain in the market, they would have created competitive pressure requiring Intuitive to offer its own repaired EndoWrists and to lower its own prices for new EndoWrists.[937] Indeed, in May 2017, when Intuitive considered competitive responses to the expected entry of rival-repaired EndoWrists in the actual world even with the advantages of its restraints,[938] Intuitive internally proposed offering repaired EndoWrists at a discount of 25-40% off the actual price it offered for new EndoWrists.[939] Intuitive continued to consider offering repaired EndoWrists in response to rival competition,[940] but ultimately did not go ahead with

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[936] *See supra* VI.B.3.

[937] *See supra* IV.B & VI.B.1.

[938] Intuitive-00273260; Intuitive-00273261 ("Update (Code Name: Dragon): as of 23 May 2017" "Company Objectives…Defensive revenue and margin protection: Displace non-validated 3rd party re-programmers where already present"); Intuitive-00273264 at 266 ("Company Benefits of Secondary Markets" includes "[c]ombat utilization of 3rd party after market refurb or reprogrammed instruments"), 267 ("Dragon (Remanufactured Base Instrument Program)…Confidence Displace non-validated 3rd party re-programmers").

[939] DeSantis (in *Rebotix*) 30(b)(6) Dep. Ex. 38 at Intuitive-00273287. Although this was a discount off of Intuitive's actual "list" price, Intuitive's actual net price was almost always equal to its list price and, even when it was not, any discount from the list price was small. *See supra* Section II.D.2.ii (collecting evidence that Intuitive stated it had a one-price policy and generally sold at its list price, and that the data showed that its actual net prices for EndoWrists equaled the list price approximately 98% of the time, and the average aggregate discount from the list price was only a fraction of one percent).

[940] *See*, e.g., Bair (in *Rebotix*) Dep. Ex. 5 (1/2017 presentation); Scoville (in *Restore*) Dep. Ex. 1 (7/2017 presentation); Ex. 2 (9/2018 presentation); Ex. 3 (9/2020 presentation).

the plan.[941] Intuitive's decision not to pursue its plan to offer repaired EndoWrists is consistent with economic rationality because the success of its exclusionary restraints in driving rivals out of the market eliminated the competitive pressure to offer repaired EndoWrists at lower prices. But Intuitive's plan to offer (even with its challenged restraints in place) repaired EndoWrists at a 25-40% discount off the actual list price it charged for new EndoWrists provides a conservative measure of how much Intuitive would have charged for repaired EndoWrists in a but-for world without those challenged restraints.

395. The but-for offering of repaired EndoWrists at a discount off of actual new EndoWrist prices would predictably also lower the but-for price for new EndoWrists because the two are substitutes for each other.[942] Indeed, Intuitive itself concluded that "Refurb instruments will be equally capable to new."[943] Surgeons at one hospital tried repaired EndoWrists and indicated "[t]here was no difference" between repaired and replacement EndoWrists.[944] Even heavy da Vinci users reported that they "couldn't tell any difference" between repaired and replacement EndoWrists.[945] The amount of the discount from actual prices can be calculated in two different ways.

396. In response to expected rival repair competition, Intuitive made another proposal to offer (even with the challenged restraints) a mix of new and repaired EndoWrists at a 20% discount from its price for new EndoWrists.[946] This 20%

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[941] Scoville (in *Restore*) Dep. at 9:25-10:3 ("Q. And at any point did Intuitive start to refurbish the core instruments for the Si in the United States for its customers? A. No.") 11:3-15 ("Q. And I just want to make sure, did you have any understanding of why the executive team chose not to proceed with refurbishing the SI instruments? A. My recollection is it was a prioritization question. Q. What do you mean by 'prioritization'? A. What investments, you know – how to describe that? Just the – the timing, level of investment. Market opportunity would have been assessed. Technical feasibility, if it had been assessed, would have been looked at and weighed against other projects. And we would have decided where to spend our time and energy.").

[942] *See supra* Section II.D.2.

[943] Intuititve-00103456 at -458. *See also*, Scoville (in *Rebotix*) Dep. at 105:1-19 and Ex. 7 at Intuitive-00103429; Bair (in *Rebotix*) Dep. at 50:17-51:15 and Ex. 5 at Intuitive-00042946.

[944] Harrich (in *Rebotix*) Dep. at 36:14-37:10.

[945] McDonald (in *Restore*) Deposition at 67:22-68:15.

[946] Scoville (in *Restore*) Dep. Ex. 1 at Intuitive-00104185 ("A 20% discount is proposed" "(versus a deeper 30% discount)") and Intuitive-00104186 ("The discount would be applied to participating instruments whether the customer is shipped refurbished or new instruments."). Again, this is a discount from list prices, but list prices were almost always the same as actual prices. *See supra* Section II.D.2.ii. Moreover, any actual discount from list price that was available for things like

discount provides a conservative measure of but-for prices for the blend of new and repaired EndoWrists because it was a discount that Intuitive planned to offer even when Intuitive enjoyed the competitive advantage imposed by its restraints on rival competition. The conservative nature of this measure is confirmed by the fact that this 20% discount for the mix is lower than the 25-40% but-for discount calculated for Intuitive-repaired EndoWrists and the average 45% discount offered for rival-repaired EndoWrists.

397. In the but-for world, each buyer who needed an EndoWrist would have purchased either (a) a repaired EndoWrist from Intuitive's rivals, (b) a repaired EndoWrist from Intuitive, or (c) a new EndoWrist from Intuitive.[947] The above analysis indicates that, whichever of those purchase choices that a buyer would have made in the but-for world, the buyer suffered the injury of paying higher prices in the actual world. Buyers who in the but-for world would have purchased a repaired EndoWrist from rivals would have paid prices at an average 45% discount off from new EndoWrist prices. Buyers who in the but-for world would have purchased a repaired EndoWrist from Intuitive would have received a 25-40% discount off new EndoWrist prices. And to the extent that buyers in the but-for world would have purchased a blend of new and repaired EndoWrists from Intuitive, a conservative measure is that they would have paid a 20% discount, as discussed in the preceding paragraph. Given these figures, a conservative measure is that, regardless of the choice that each buyer would have made in the but-for world, they would have paid at least 20% less for EndoWrists than they did in the actual world. This conservative method does not require determining the extent to which each buyer in the but-for world would have bought repaired EndoWrists from rivals, repaired EndoWrists from Intuitive, or new EndoWrists from Intuitive.

398. The above price effect would begin when but-for entry would have occurred without the challenged restraints. I understand that date is disputed in this case. There is evidence in this case that but-for entry would have occurred either (a) before the May 2017 beginning of the Class Period,[948] or (b) at least when the first

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meeting volume thresholds would also be available in the but-for world, and thus result in the same percentage-based discount relative to actual prices. For example, if the actual list price were $3000 and a 1% discount were available for meeting a volume threshold, then the actual net price paid would be $2970. If the list price were discounted by 20% in the but-for world, the but-for list price would be $2400 and a 1% volume-based discount from that would bring the price to $2376, which is the same as a 20% discount from the actual net price paid.

[947] This would be true for initial EndoWrist purchases in addition to replacement EndoWrist purchases.

[948] *Supra* Section IV.D.

repaired EndoWrist was actually sold by rivals, which was on July 11, 2018,[949] I have been asked by counsel to calculate damages under both scenarios.

399. During the period of adverse price effects, a conservative measure of the damage to each class member from those price effects is the dollar amount each paid for EndoWrists times the 20% price effect. This is a conservative measure not only because the 20% is conservative for the reasons noted above, but also because this method calculates damages based only on the overcharge that buyers paid on the EndoWrist units that they purchased in the actual world. In the but-for world, lower prices would have predictably increased market output and thus increased the number of units that each purchased. Accordingly, the challenged restraints caused the additional economic harm that buyers were deprived of additional purchases that they would have valued more than they would have paid for them in the but-for world (that is, they also suffered harm from the deadweight loss caused by inflated prices). I conservatively put that additional harm aside because it is difficult to calculate just how many additional units each buyer would have purchased in the but-for world and how much they would have valued those additional EndoWrists.

400. The lower but-for price would apply to both initial and replacement EndoWrist purchases. Without the restraints, buyers could have bought even their initial EndoWrists in the form of repaired EndoWrists to the extent that either clearance would not be required or that Intuitive and its rivals would have obtained 510(k) clearance to do so.[950] Even if that were not the case, there would still be a chain of substitution whereby: (1) lower prices for repaired EndoWrists would lower prices for new replacement EndoWrists, given that they are functionally equivalent and both would be available options, and (2) the lower prices for new replacement EndoWrists would constrain prices for new initial EndoWrists, given that they are identical and sold for the same price by Intuitive.[951] Thus, whether or not buyers could buy initial EndoWrists in the form of repaired EndoWrists, prices for initial EndoWrists would be lower in the but for-world. Therefore, the volume on which I calculate damages includes both initial and replacement EndoWrists sold by Intuitive. Further, because Intuitive has a one-price policy whereby all customers receive the same price with the same discounts for things like volume and quick

[949] Restore-00055937.

[950] *See supra* Sections II.D.2.iii; IV.C.1.

[951] *See* discussion of Intuitive's one-price policy and lack of price discrimination in Section II.D.2.ii.

payment, with no price discrimination based on other customer features,[952] any price reduction caused by competition would be broadly enjoyed across the customer base.

401. This but-for 20% discount is applied to the net price of Intuitive's EndoWrist sales. I assume, based on the evidence cited in the preceding paragraphs, that customers who were buying at the same list price, with small discounts off this list price, would continue to do so in the but-for world. Therefore, the 20% but-for discounting of list prices would imply the same 20% discount for all buyers. One way this could occur is if customers continued to receive the same percentage discount off list price in the but-for world as they received in the actual world. For example, even if in the actual world one buyer pays $3,000 and another buyer pays $2,700 because of a 10% volume-based discount, in the but-for world with the 20% base discount, the former buyer would pay $2,400 and the second buyer would pay $2,160, each of which are 20% off what they actually paid.

402. Applying this conservative method, the damages from anticompetitively elevated prices for new and repaired EndoWrists to all members of the proposed class were $805 million if but-for rival entry would have been before May 2017 and $631 million if but-for rival entry would have occurred in July 2018. Both are calculated through the end of when data on purchases is available, which is December 31, 2021. See Table 5 below. The damages from anticompetitively elevated prices for new and repaired EndoWrists to the named class members during this period are also shown in the following table. Separate damages are also calculated for the S/Si versus X/Xi models in case the tribunal or factfinder sustains the claims relative to only one of those sets of models.

[952] *See* Intuitive-00203904-906 at 905 ("has [had] a strong one-price policy" "since 1999."); Vavoso (in *Rebotix*) Dep. at 211:9-212:16 (Intuitive representative testifying that Intuitive does not price discriminate depending on whether a hospital was willing to purchase Rebotix's EndoWrist repair services); *supra* Section II.D.2.ii (showing that Intuitive almost always charges the list price to all customers, other than some small discounts for things like volume that do not depend on customer characteristics and would equally apply in the but-for world).

Table 5: Damages from Anticompetitively Elevated EndoWrist Prices[953]

Plaintiff	Product Platform	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health TOTAL	da Vinci S/Si	1,841,000	368,200	1,154,300	230,860
Franciscan Health TOTAL	da Vinci X/Xi	7,984,785	1,596,957	6,613,385	1,322,677
	Total	**9,825,785**	**1,965,157**	**7,767,685**	**1,553,537**
Larkin Community Hospital	da Vinci S/Si	778,950	155,790	321,300	64,260
Larkin Community Hospital	da Vinci X/Xi	794,800	158,960	390,300	78,060
	Total	**1,573,750**	**314,750**	**711,600**	**142,320**
Valley Medical Center	da Vinci S/Si	497,200	99,440	88,400	17,680
Valley Medical Center	da Vinci X/Xi	2,198,895	439,779	2,198,895	439,779
	Total	**2,696,095**	**539,219**	**2,287,295**	**457,459**
Classwide	da Vinci S/Si	1,051,613,083	210,322,618	608,466,148	121,693,227
Classwide	da Vinci X/Xi	2,974,204,377	594,840,876	2,546,663,861	509,332,773
	Total	**4,025,817,459**	**805,163,494**	**3,155,130,010**	**631,026,000**

2. Damages from the Anticompetitive Effect on Use Limits on EndoWrists

403. Without the challenged restraints, the use limits that Intuitive imposed on EndoWrists would have been higher for two reasons. First, as noted above, those use limits have themselves been challenged as anticompetitive restraints that reinforced the other anticompetitive restraints.[954] If the factfinder agrees that the use limits were illegal restraints, those use limits would never have existed in the but-for world, and thus damages from the suppressed use limits would have begun from the beginning of the class period in May 2017. Second, unrestrained rival repair of EndoWrists would have created competitive pressure on Intuitive to raise or eliminate the use limits on its EndoWrists in the but-for world.[955] The latter effect would begin when but-for entry would have occurred in the but-for world. The above price effect would begin when but-for entry would have occurred without the challenged restraints. I understand that date is disputed in this case. Again, there is evidence in this case that but-for entry would have occurred either (a) before the

[953] Source: Intuitive Instrument & Accessory Transaction Data. I do not calculate damages from elevated prices for EndoWrists compatible with the Standard or SP da Vinci because during the class period their installed base and compatible-EndoWrist purchase volumes were relatively low. *See supra* Figure 4; Intuitive Instrument & Accessory Transaction Data. Although the S model had an even lower installed base than the SP, I consider the S models because S and Si EndoWrists were interchangeable. For a corresponding list of damages by EndoWrist model, see Exhibits C and D.

[954] *See supra* Section VI.C.1.

[955] *See supra* Section VI.C.2 and VI.C.3.

May 2017 beginning of the Class Period,[956] or (b) at least when the first repaired EndoWrist was actually sold by rivals, which was on July 11, 2018,[957] I have been asked by counsel to calculate damages under both scenarios.

404. The injury from the anticompetitive suppression of EndoWrist use limits is separate and apart from the effect of unrestrained rival competition on the pricing for repaired or new EndoWrists. All of the calculations in the preceding section assume the use limit imposed by Intuitive is no different in the but-for world. Likewise, all the calculations in this section assume the price charged per EndoWrist by Intuitive is no different in the but-for world.

405. Intuitive's own documents provide a basis to calculate how much higher use limits would have been in the but-for world. Traditionally, Intuitive had imposed a use limit of ten uses on all but a handful of EndoWrists.[958] As noted above, Intuitive staff's internal analysis was to guess that its instruments could be used about 20 times, and Intuitive in fact tested them to 30 use cycles and used training EndoWrists 30 times.[959] And other Intuitive internal analysis even contemplated use limits of 40 to 100.[960] Other sources like Rebotix and Deutsche Bank have indicated that 29-59 uses was feasible.[961] Other evidence and plaintiff expert analysis indicates that there is no reason to impose any use limit on EndoWrists, because hospitals could just use them as many times as they could keep them in working order.[962] Given this range of evidence, I conservatively conclude that in a but-for world in which Intuitive would have faced unrestrained competition from rival repaired EndoWrists, Intuitive would have increased current use limits on EndoWrists to at least 20 uses. I likewise conservatively assume that to the extent that, in the but-for world, no use limits would have been permitted or buyers would have used rival repair providers to lift any use limit, buyers would have been able to increase current usage levels to at least 20 uses.

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[956] *Supra* Section IV.D.
[957] Restore-00055937.
[958] *See*, e.g., DeSantis (in *Rebotix*) Dep. at 171:11-13 ("Q…The Si instruments, they were typically initially set at ten lives; right? A Yes."). Zafar (in *In re: da Vinci*) Dep. Ex. 2 at Restore-00002860; Intuitive-00360827 (da Vinci Xi instrument & accessory catalog, May 2016); Intuitive-00000129 (da Vinci Si instrument & accessory catalog, March 2020). There were a handful of exceptions to this, such as Black Diamond Micro Forceps with 15 uses (Intuitive-00360827-850 at 833).
[959] *See supra* Section VI.C.2.
[960] *Id.*
[961] *See supra* Section VI.C.3.
[962] *Id.*

406. The percentage suppression of uses for each model equals the but-for use limit minus the actual use limit for that model at any point in time divided by the but-for use limit. For example, if the actual use limit was 10, the but-for use limit would be 20 and thus the percentage suppression of uses would be 10/20 = 50%. This percentage suppression of uses is equivalent to preventing a per-use price discount of the same percentage. For example, suppose Intuitive sold an EndoWrist with a 10-use limit for $3000. Its per-use price would be $300. If in the but-for world Intuitive instead would have sold a $3000 EndoWrist with a 20-use limit, the but-for per-use price would be $150, which would be a 50% discount. Corrected Exhibit E shows, for each EndoWrist model and time period, what the percentage suppression of uses was.

407. Given that the percentage suppression of uses is equivalent to preventing an equivalent reduction in the per-use price, the damage to each class member from the suppressed use limits is the dollar amount each paid for each EndoWrist model times the percentage suppression of uses. To derive this mathematically, call N the number of EndoWrists bought in the actual world, P the price of EndoWrists in the actual world, and S the percent suppression of uses from but-for levels. Then buyers in the actual world paid PN. In the but-for world, if we (as above) conservatively assume that a decline in price per-use would not expand uses in the but-for world, then the number of EndoWrists that buyers would buy to maintain same number of uses as actual world would be N(1-S). Thus, in the but-for world buyers would have paid PN(1-S). Thus, damages equal what they actually paid (PN) minus what would have paid in the but-for world, or PN - PN(1-S) = PNS.

408. Using this method, the damages from suppressed use limits for EndoWrists to all members of the proposed class are $1.831 billion if the suppression began before May 2017 (either because the use limits were illegal or because but-for entry by repair rivals before that time would have created competitive pressure for Intuitive to have raised those use limits) and $1.396 billion if the suppression began in July 2018 (if the use limits were not themselves illegal and but-for entry by repair rivals would not have occurred until that time and thus would not have created competitive pressure to raise use limits until that time). See Corrected Table 6 below. Both are calculated through the end of when data on purchases is available, which is December 31, 2021. The damages from suppressed use limits for EndoWrists to the named class members during this period are shown in the following Table. Separate damages are also calculated for the S/Si versus X/Xi models in case the tribunal or factfinder sustains the claims relative to only one of those sets of models.

Corrected Table 6: Classwide and Named Plaintiff Damages from EndoWrist Use Limit Suppression[963]

Plaintiff	Product Platform	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health	da Vinci S/Si	1,841,000	920,500	1,154,300	577,150
Franciscan Health	da Vinci X/Xi	7,984,785	3,520,273	6,613,385	2,834,573
	Total	**9,825,785**	**4,440,773**	**7,767,685**	**3,411,723**
Larkin Community Hospital	da Vinci S/Si	778,950	370,350	321,300	158,400
Larkin Community Hospital	da Vinci X/Xi	794,800	397,400	390,300	195,150
	Total	**1,573,750**	**767,750**	**711,600**	**353,550**
Valley Medical Center	da Vinci S/Si	497,200	248,600	88,400	44,200
Valley Medical Center	da Vinci X/Xi	2,198,895	978,522	2,198,895	978,522
	Total	**2,696,095**	**1,227,122**	**2,287,295**	**1,022,722**
Classwide	da Vinci S/Si	1,051,613,083	525,284,636	608,466,148	303,923,913
Classwide	da Vinci X/Xi	2,974,204,377	1,306,037,048	2,546,663,861	1,092,477,760
	Total	**4,025,817,459**	**1,831,321,684**	**3,155,130,010**	**1,396,401,673**

3. Combined Damages from the Anticompetitive Effect on Use Limits and Price Effects on EndoWrists

409. The price effect damages calculation above assumes the use limits do not change in the but-for world, and the use limit effect damages calculation above assumes the price does not change in the but-for world. Those are thus two separate calculations of damages from those separate anticompetitive effects if only one of them is found. But if both anticompetitive effects are found, the combined effect of the two is not equal to the summation of the two separate calculations. The simple summation of the two effects would ignore the fact that some of the units on which a price effect occurred were purchased as a result of the use limit effect. Instead, the combined effect will be equal to the price effect plus the use limit effect minus the price effect times the use limit effect.

410. To derive this mathematically, call D the extent to which but-for prices would have been discounted from actual prices, and otherwise use the same variables defined above. (I.e., N is the number of EndoWrists bought in actual world, P is the

[963] Source: Intuitive Instrument & Accessory Transaction Data. I do not calculate damages from use limit suppression for EndoWrists compatible with the Standard or SP da Vinci because during the class period their installed base and compatible-EndoWrist purchase volumes were relatively low. *See supra* Figure 4; Intuitive Instrument & Accessory Transaction Data. For a corresponding list of damages by EndoWrist model, see Exhibits F and G.

price of EndoWrists in the actual world, and S is the percent suppression of uses from but-for usage levels.) In that case, in the but-for world the price paid for EndoWrists would be (1-D)P, and the number of EndoWrists that buyers would buy to maintain the same number of uses as in the actual world would be N(1-S).[964] Thus, in the but-for world buyers would have paid (1-D)PN(1-S). Thus, damages equal what they actually paid (PN) versus what they would have paid in the but-for world would be PN – (1-D)PN(1-S) = PN[1-(1-D)(1-S)] = PN[1-1+D+S-DS] = PN(D+S-DS).

411. Using this method, the damages from a combination of anticompetitively elevated prices and suppressed use limits for EndoWrists to all members of the proposed class are $2.270 billion if the suppression began before May 2017 (either because the use limits were illegal or because but-for entry by repair rivals before that time would have created competitive pressure for Intuitive to have raised those use limits) and $1.748 billion if the suppression began in July 2018 (if the use limits were not themselves illegal and but-for entry by repair rivals would not have occurred until that time and thus would not have created competitive pressure to raise use limits until that time). See Corrected Table 7 below. Both are calculated through the end of when data on purchases is available, which is December 31, 2021. The damages from a combination of anticompetitively elevated prices and suppressed use limits for EndoWrists to the named class members during this period are shown in the following Table. Separate damages are also calculated for the S/Si versus X/Xi models, in case the tribunal or factfinder sustained the claims relative to only one of those sets of models.

[964] The latter again conservatively assumes that lower prices would not increase usage.

Corrected Table 7: Classwide and Named Plaintiff Damages from Combination of Price Effect and Use Limit Suppression[965]

Plaintiff	Product Platform	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health TOTAL	da Vinci S/Si	1,841,000	1,104,600	1,154,300	692,580
Franciscan Health TOTAL	da Vinci X/Xi	7,984,785	4,413,176	6,613,385	3,590,336
	Total	**9,825,785**	**5,517,776**	**7,767,685**	**4,282,916**
Larkin Community Hospital	da Vinci S/Si	778,950	452,070	321,300	190,980
Larkin Community Hospital	da Vinci X/Xi	794,800	476,880	390,300	234,180
	Total	**1,573,750**	**928,950**	**711,600**	**425,160**
Valley Medical Center	da Vinci S/Si	497,200	298,320	88,400	53,040
Valley Medical Center	da Vinci X/Xi	2,198,895	1,222,597	2,198,895	1,222,597
	Total	**2,696,095**	**1,520,917**	**2,287,295**	**1,275,637**
Classwide	da Vinci S/Si	1,051,613,083	630,550,326	608,466,148	364,832,358
Classwide	da Vinci X/Xi	2,974,204,377	1,639,670,514	2,546,663,861	1,383,314,981
	Total	**4,025,817,459**	**2,270,220,841**	**3,155,130,010**	**1,748,147,339**

B. Quantification of Damages for da Vinci Service Overcharge

412. As discussed in the preceding part, without the challenged restraints, rivals would have been able to enter the market for da Vinci service and compete more effectively. While the total volume of service work performed by IRCs in the actual world was restricted to Restore and for a limited time, the average discounts offered were potentially large. For example, Restore offered to perform service work for (approximately) $7,000 while Intuitive had quoted (approximately) $27,000 for the same work, a 74% discount.[966] For time-and-materials servicing, Restore set prices at $395 an hour while Intuitive charged $995 an hour – implying a 60% discount for Restore.[967] In the but-for world, Restore and potentially other rivals would have been able to expand more rapidly, and potentially earlier.

413. Because without the challenged restraints those rivals would had been able to expand and remain in the market, they would have created competitive pressure requiring Intuitive to lower its own prices for da Vinci service.[968] Clif

[965] Source: *supra* Table 5 and Corrected Table 6 and formula for combined damages derived above. For a corresponding list of damages by EndoWrist model and Plaintiff, see Corrected Exhibits H and I.
[966] *See supra* Section VI.D.1.
[967] Parker (in *In re: da Vinci*) Dep. at 167:5-14; Intuitive-00154125. ($395 – $995)/$995 = -60%.
[968] *See supra* Section VI.D.

Parker of Restore testified, "We felt that we could get 50 to 60 percent of the – the customers to use us for some form of da Vinci service on the robot."[969] To calculate how much lower Intuitive's prices would have been in the but-for world, I use as a yardstick the experience of Abbott Laboratories' medical equipment repair and maintenance service business. As described in Section VI.D.2 above, this is a relevant benchmark because Abbott is also a medical device OEM and is the firm most similar to Intuitive in terms of size within this medical equipment repair and maintenance service industry. I calculate that Intuitive's da Vinci service prices would have needed to be discounted by 24% relative to actual prices in order for Intuitive's margins to match those of Abbott Laboratories' medical equipment repair and maintenance service business.[970] This is likely conservative because the industry average profit margin for other leading firms' relevant business segments is significantly lower than that of the Abbott yardstick.[971]

414. In the but-for world, each buyer who needed da Vinci service would have purchased either (a) service from Intuitive rivals, or (b) service from Intuitive. The above analysis indicates that, whichever of those purchase choices that a buyer would have made in the but-for world, the buyer suffered the injury of paying higher prices in the actual world. The limited evidence in this case suggests that buyers who in the but-for world would have purchased service from rivals might have been harmed by losing as much as a 74% discount off of actual Intuitive da Vinci service prices.[972] Buyers who in the but-for world would have purchased service from Intuitive would have paid 24% less than they did in the actual world. Given these figures, a conservative measure is that, regardless of the choice that each buyer would have made in the but-for world, they would have paid 24% less for da Vinci

[969] Parker (in *In re: da Vinci*) Dep. at 166:4-16.

[970] As described in Section VI.D.2 above, I calculate Intuitive's service EBIT profit margin to be 42% while Abbott's medical equipment repair and maintenance service EBIT profit margin was 24%. Let P1 be the old price, P2 be the new price, c be cost (which remains unchanged). The old margin of 42% implies (P1 – c)/P1 = 0.42 => (1-.42)P1 = c; similarly, a new margin of 24% implies (1-.24)P2=c; (1-.42)P1=c=(1-.24)P2 => (1-.42)P1=(1-.24)P2 => P2/P1 = (1-.42)/(1-.24); the percent price decline to go from P1 to P2 is (P2-P1)/P1 = P2/P1 – 1 =(1-.42)/(1-.24) = .58/.76 – 1 = .76 – 1 = -0.24 or a 24% price drop.

[971] IBISWorld, *Medical Equipment Repair & Maintenance Services*, OD4964, December 2021, at 29 (Abbott Laboratories margin 24.21%), 31 (General Electric Company margin 17.85%), 33 (Siemens Ag margin 12.04%), 35 (Koninklijke Philips Nv margin 16.15%), 23 (industry average margin 8.2%). Profit margin is in terms of Earnings Before Interest and Tax (EBIT), reported specifically for medical equipment repair and maintenance services.

[972] *See supra* Section VI.D.1.

service than they did in the actual world.[973] This conservative method does not require determining the extent to which each buyer in the but-for world would have bought da Vinci service from rivals or from Intuitive.

415. The above price effect would begin when but-for entry would have occurred without the challenged restraints. I understand that date is disputed in this case. There is evidence in this case that but-for entry would have occurred either (a) before the May 2017 beginning of the Class Period,[974] or (b) at least when any IRC (i.e., Restore) first sold da Vinci servicing, which was January 14, 2019.[975] I have been asked by counsel to calculate damages under both scenarios.

416. The overcharge on da Vinci service paid by each class member equals the dollar amount of da Vinci service sold times the but-for discount percentage they would have received without the restraints, which above I conservatively calculate to be 24%. (In addition to using a conservative measure of the price effect, this methodology conservatively excludes the additional harm from the fact that in the but-for world lower prices would have also led buyers to purchase more servicing.) Applying this conservative method, the damages from anticompetitively elevated prices for da Vinci service to all members of the proposed class were $494 million if but-for rival entry would have been before May 2017 and $350 million if but-for rival entry would have occurred in January 2019. Both are calculated through the end of when data on purchases is available, which is December 31, 2021. See Table 8 below. The damages from anticompetitively elevated prices for da Vinci servicing to the named class members during this period are shown in the following table. Separate damages are also calculated for S, Si, X, and Xi servicing in case the tribunal or factfinder sustains the claims relative to only one or some of those models.[976]

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[973] This is a reasonable inference even though some servicing was incontestable in the sense that it could not be provided by rivals. The reason is that Intuitive charged the same hourly for both contestable da Vinci servicing and incontestable da Vinci servicing, so that rival competition that drove down the price for contestable da Vinci servicing would also drive down the price for incontestable da Vinci servicing. *See supra* Section II.F.4.

[974] *Supra* Section V.E.

[975] Restore-00055937.

[976] Given that da Vinci servicing was linked to compatible EndoWrist repair (*see* Parker (in *In re: da Vinci*) Dep. at 164:21-165:6), it is logical that in a but-for world with unrestrained rival repair of X/Xi-compatible EndoWrists, rivals would also provide X/Xi servicing. I am unaware of any technical barriers to doing servicing on the da Vinci S, X, and Xi relative to the da Vinci Si, on which Restore successfully performed servicing. *Supra* Section V.A. Furthermore, the 2021Q1 installed base of da Vinci S, Si, X, and Xi models was sufficient to justify third-party IRC

Table 8: Overcharges for da Vinci Service, by Named Plaintiff and Classwide[977]

Plaintiff	Type	Service Sales from 5/21/2017	Damages from 5/21/2017	Service Sales from 1/14/2019	Damages from 1/14/2019
Franciscan Health	Si	2,397,264	575,343	1,218,949	292,548
Franciscan Health	Xi	6,057,508	1,453,802	4,584,114	1,100,187
Franciscan Health	**Total**	**8,454,772**	**2,029,145**	**5,803,062**	**1,392,735**
Larkin Community Hospital	Si	132,665	31,840	84,526	20,286
Larkin Community Hospital	Xi	297,973	71,514	190,034	45,608
Larkin Community Hospital	**Total**	**430,639**	**103,353**	**274,560**	**65,894**
Valley Medical Center	Si	422,509	101,402	129,667	31,120
Valley Medical Center	Xi	1,042,546	250,211	1,042,546	250,211
Valley Medical Center	**Total**	**1,465,055**	**351,613**	**1,172,213**	**281,331**
Classwide	S	1,838,917	441,340	0	0
Classwide	Si	827,192,363	198,526,160	420,652,457	100,956,592
Classwide	X	60,762,557	14,583,014	59,708,969	14,330,153
Classwide	Xi	1,169,578,080	280,698,752	976,199,596	234,287,904
Classwide	**Total**	**2,059,371,917**	**494,249,266**	**1,456,561,022**	**349,574,649**

C. Total Damages Through the End of 2021

417. The total conservatively calculated damages to each class member equals the sum of the damages they suffered from inflated prices for new and repaired EndoWrists, a suppressed use limit on EndoWrists, and inflated prices on da Vinci servicing. The following table reports the results for the class as a whole and for each named class member. This calculation is for each of the but-for entry dates described above (May 2017 and July 2018 and January 2019), through the end of sales data in December 2021.

servicing. *See* Parker (in *In re: da Vinci*) Dep. at 151:13-15 ("…only if they've got, you know, 15 or more [robots] in the market does it make sense to have dedicated [Restore] personnel to do those robot repairs.").

[977] Source: Intuitive-00695236, Intuitive-00706089, Intuitive-00000316. I do not calculate damages from elevated prices for servicing Standard or SP da Vinci robots because during the class period their installed base and usage were relatively low. *See supra* Figure 4.

Corrected Table 9: Classwide and Named Plaintiff Damages From Inflated EndoWrist Prices, Suppressed EndoWrist Use Limits, and Inflated da Vinci Service Prices[978]

	Earlier But-For Entry*			
	Price-Effect EW Damages	**Use-Effect EW Damages**	**Combined Effect EW Damages**	**Services Damages**
CLASS	805,163,492	1,831,321,684	2,270,220,837	494,249,248
Franciscan Health	1,965,157	4,440,773	5,517,776	2,029,145
Larkin Community Hospital	314,750	767,750	928,950	103,353
Valley Medical Center	539,219	1,227,122	1,520,917	351,613

	Price-Effect EW + dV Service Damages	**Use-Effect EW + dV Service Damages**	**Combined EW + dv Service Damages**
CLASS	1,299,412,740	2,325,570,932	2,764,470,085
Franciscan Health	3,994,302	6,469,919	7,546,921
Larkin Community Hospital	418,103	871,103	1,032,303
Valley Medical Center	890,832	1,578,736	1,872,530

	Earlier EndoWrist Repair But-For Entry with Late da Vinci Servicing But-For Entry		
	Price-Effect EW + dV Service Damages	**Use-Effect EW + dV Service Damages**	**Combined EW + dv Service Damages**
CLASS	1,154,738,148	2,180,896,340	2,619,795,493
Franciscan Health	3,357,892	5,833,508	6,910,511
Larkin Community Hospital	380,644	833,644	994,844
Valley Medical Center	820,550	1,508,453	1,802,248

	Later EndoWrist Repair But-For Entry with Early da Vinci Servicing But-For Entry		
	Price-Effect EW + dV Service Damages	**Use-Effect EW + dV Service Damages**	**Combined EW + dv Service Damages**
CLASS	1,125,275,250	1,890,650,921	2,242,396,586
Franciscan Health	3,582,682	5,440,869	6,312,061
Larkin Community Hospital	245,673	456,903	528,513
Valley Medical Center	809,072	1,374,336	1,627,250

	Later But-for Entry			
	Price-Effect EW Damages	**Use-Effect EW Damages**	**Combined Effect EW Damages**	**Services Damages**
CLASS	631,026,002	1,396,401,673	1,748,147,338	349,574,656
Franciscan Health	1,553,537	3,411,723	4,282,916	1,392,735
Larkin Community Hospital	142,320	353,550	425,160	65,894
Valley Medical Center	457,459	1,022,722	1,275,637	281,331

	Price-Effect EW + dV Service Damages	**Use-Effect EW + dV Service Damages**	**Combined EW + dv Service Damages**
CLASS	980,600,658	1,745,976,329	2,097,721,994
Franciscan Health	2,946,272	4,804,458	5,675,651
Larkin Community Hospital	208,214	419,444	491,054
Valley Medical Center	738,790	1,304,053	1,556,968

* Earlier But -For Entry is prior to May 17, 2017 for both EndoWrist repair and da Vinci service.
** Later But-For Entry is July 11, 2018 for EndoWrist repair and January 14, 2019 for da Vinci service.

D. Plaintiffs Will Continue to Suffer Quantifiable Damages as Long as Intuitive's Tying and Exclusivity Restraints Continue

418. So long as Rebotix, Restore, SIS, and other potential entrants remain excluded by anticompetitive restraints, there is continuing harm. This continuing

antitrust harm includes loss of consumer choice, harm to the environment, potential loss of innovation, inflated prices, and suppressed use limits. I conservatively calculate that in 2021 (the last full year of data), total damages from the anticompetitive restraints were $586 million ($125 million from da Vinci servicing and $461 million for EndoWrists) to the proposed class and a total of $2 million for the three named plaintiffs ($0.6 million from da Vinci servicing and $1.4 million for EndoWrists).[979] Assuming Intuitive's volume of sales remains the same or higher, this implies that as long as the anticompetitive restraints continue, the proposed class will continue to suffer at least $586 million in harm annually and the three named plaintiffs will continue to suffer a total of at least $2 million in harm annually.[980]

[978] Source: *Supra* Tables 5 and 8 and Corrected Tables 6 and 7. Damages totals correspond to S/Si- and X/Xi-compatible EndoWrists and da Vinci S, Si, X and Xi robot servicing.
[979] Source: work papers to Tables 5 and 8 and Corrected Tables 6 and 7.
[980] While this conservatively assumes no growth in market size, it would also be possible to perform this calculation using projected growth rates. *See*, e.g., Intuitive-00701321.

APPENDIX A: MATERIALS RELIED UPON

- All documents, depositions, academic literature, web materials, and other sources cited in the main body and footnotes.

- The following sources for data and figures:

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Intuitive Robot Transaction Data (Intuitive-00595429 – Intuitive-00595463, Intuitive-00849019)

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EXHIBIT A

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"The Real Problem with Independent Counsels," The Washington Times, A19 (Jun 30, 1999)

"Foul Smoke," The Washington Post, A15 (August 4, 1998)

"The Court Failed My Test," The Washington Times, A-19 (July 10, 1998)

"Microsoft Gets an Undeserved Break," The New York Times,A21 (June 29, 1998)

"Medi-Choice," The New Republic, 24 (November 13,1995)

"Term Limits: Voters Aren't Schizophrenic," Wall Street Journal, A-16 (March 14, 1995)

Harvard Committees

Chair, Harvard Law School Lateral Appointments Committee (1998-99), Member (2003-05, 2011-2014).

Member, Harvard Law School Entry Level Appointments Committee (2009-2011).

Member, Harvard University Standing Committee on the Degree of Doctor of Philosophy in Health Policy (1996-99, 2006-07).

Member, Harvard University Internal Advisory Board for the Interfaculty Initiative in Health Policy (1996-99).

Member, Harvard Law School Lecturers and Visitors Committee (1996-98).

Past Academic Positions

1988-95	Professor of Law, Boalt Hall, University of California at Berkeley
1995	Visiting Professor of Law, Univ. of Chicago Law School
1994	Visiting Professor of Law, Harvard Law School
1993	Visiting Olin Faculty Fellow, Yale Law School
1991-92	Visiting Scholar in Europe at the Karolinska Institute, the Centre for Health

Economics, the Rockefeller Foundation Study Center, Cambridge University, the European University Institute and the University of Florence

Clerkships

1987-88	Clerk for Justice William J. Brennan, Jr., United States Supreme Court
1986-87	Clerk for Judge William A. Norris, U.S. Court of Appeals for the Ninth Circuit
1986	Clerk for U.S. Solicitor General's Office, Washington, D.C.

Bar Admissions: Massachusetts (2000); Pennsylvania (1986); United States Courts of Appeals for the Fourth (1997), Sixth (2008), and Ninth Circuits (1987); Supreme Court of the United States (1997).

ECONOMICS EXPERT WORK

President, Legal Economics LLC, 2007 to present.

Senior Expert at Criterion Economics LLC, 2004-2007

Recipient in 2016 and 2020 of AAI award for Outstanding Antitrust Litigation Achievement in Economics.

Named One of World's Leading Competition Economists in the *International Who's Who of Competition Lawyers and Economists*.

Testifying Expert in *Moehrl v. Nat'l Ass'n of Realtors,* a case alleging that Realtor associations have agreements that restrain the market for real estate broker services.

Testifying Expert in *Markson v. CRST Int'l,* a case alleging an agreement not to poach truck drivers from rival trucking companies.

Testifying Expert in *In re Broiler Chicken Antitrust Litigation*, a case alleging that producers of broiler chickens engaged in conspiracies to share information, restrict output, and manipulate or fix prices.

Testifying Expert in *Cameron v. Apple*, a class action by app developers alleging that Apple has anticompetitively excluded competition for app distribution.

Testifying Expert in *In Re Novartis And Par Antitrust Litigation,* a case alleging an reverse payment patent settlement delayed generic competition with the branded pharmaceutical Exforge.

Testifying Expert in *In Re EpiPen Marketing Sales Practices and Antitrust Litigation*, a case alleging anticompetitive reverse payments and foreclosing agreements.

Testifying Expert in *Roxul USA, Inc. v. Armstrong World Industries, Inc.*, a case alleging exclusive dealing agreements in the market for suspended acoustical ceiling tiles.

Testifying Expert in *Sitts v. Dairy Farmers of America, Inc.*, a case alleging a conspiracy to suppress raw milk prices.

Testifying Expert in *In Re Qualcomm Antitrust Litigation*, a case alleging tying and exclusive dealing involving modem chipsets and cellular standard essential patents.

Testifying Expert in *In Re Niaspan Antitrust Litigation*, a case alleging a reverse payment patent settlement.

Testifying Expert in *In Re Lamictal Direct Purchaser Antitrust Litigation*, a case alleging a reverse payment patent settlement.

Testifying Expert in *In re Namenda Antitrust Litigation*, a case alleging a reverse payment patent settlement and product hop.

Testifying Expert in *In re Lidoderm Antitrust Litigation*, a case alleging a reverse payment patent settlement.

Testifying Expert in *Valassis Communications v. News Corp,* a case alleging anticompetitive bundling and other exclusionary conduct.

Testifying Expert in *GN Netcom v. Plantronics,* a case alleging exclusive dealing in the distribution of contact center and office headsets.

Testifying Expert in *Louisiana Wholesale Drug v. Unimed Pharmaceuticals (Androgel case)*, a case alleging a reverse payment patent settlement.

Testifying Expert in *Garber v. Office of the Commissioner of Baseball,* a case alleging horizontal territorial restraints on broadcasting baseball games.

Testifying Expert in *Suture Express v. Cardinal Health*, a case alleging tying and bundled loyalty contracts in medical distribution.

Testifying Expert in *Savant v. Crestron*, a case alleging exclusive dealing in the high-end home control system market

Testifying Expert in *Castro et. al. vs Sanofi Pasteur*, a case alleging anticompetitive bundled loyalty contracts in the vaccines industry.

Testifying Expert in *In re Mushroom Direct Purchaser Antitrust Litigation*, a case alleging price-fixing in the fresh mushroom market.

Testifying Expert in *It's My Party, Inc. v. Live Nation, Inc.*, a case alleging anticompetitive conduct in markets for promotion and amphitheaters.

Testifying Expert in *Retractable Technologies v. Becton Dickinson*, a case alleging exclusionary contracts in syringe and IV catheter markets.

Testifying Expert in *Caldon v. Westinghouse Electric*, a case alleging attempted monopolization.

Testifying Expert in *King Drug v. Cephalon*, a case alleging that a reverse payment settlement of a patent dispute delayed entry and restrained competition in a pharmaceutical market.

Testifying Expert for the United States in *United States v. Wyeth*, a case involving claims of bundled sales and bundled discounts in a pharmaceutical market, which resulted in a $784 million settlement for the United States.

Testifying Expert in *BAE Holdings AH v. ArmorWorks Enterprises*, a case alleging price discrimination by a ceramic tile manufacturer resulting in harm to downstream competition.

Testifying Expert in *In re Marsh & Mclennan Companies, Inc. Securities Litigation*, a case alleging securities violations from failure to disclose bid steering.

Testifying Expert in *Tessera Technologies v. Hynix Semiconductor*, a case alleging conspiracy to exclude outside technologies from semiconductor markets.

Testifying Expert in *American Steel Erectors v. Local Union No. 7*, a case alleging boycott claims related to steel erection and labor markets.

Testifying Expert in *BP America v. Repsol*, an arbitration.

. Testifying Expert in *Food Lion v. Dean Foods Company*, a class action alleging conspiracies to restrict and foreclose competition in milk markets.

Testifying Expert in *Eisai Inc. v. Sanofi-Aventis U.S. LLC*, a case by a rival alleging foreclosure in anticoagulant pharmaceutical markets.

Testifying Expert in *Daniels v. Tyco*, a case by a rival alleging foreclosure from sharps containers and GPO markets.

Testifying Expert in *Natchitoches Parish Hospital v. Tyco*, a class action concerning medical sharps containers and GPO markets.

Testifying Expert in *Amgen v. F. Hoffman La Roche*, concerning erythropoietin-simulating agents (ESAs) and white blood cell simulators (WBCs) pharmaceutical markets.

Testifying Expert in *White v. NCAA*, concerning markets for athletic and educational services.

Testifying Expert in *Applied Medical Resources v. Ethicon, Inc,* concerning sutures, trocars, and GPO markets.

Testifying Expert in *Masimo Corp. v. Tyco Health Care Group*, concerning oximetry products and GPO markets.

Testifying Expert in *Rochester Medical v. Bard*, concerning catheter and GPO markets.

Testifying Expert in *Retractable Technologies, Inc. v. Becton Dickinson*, concerning syringes and GPO markets.

Testifying Expert in *Spartanburg v. Hill-Rom*, a class action concerning hospital beds and GPO markets.

Testifying Expert in *Mountain Area Realty v. Wintergreen Partners,* concerning conduct in the real estate brokerage services market.

Testifying Expert in *Louisiana Municipal Police Employees' Retirement System v. Crawford,* concerning merger in the pharmacy benefit manager market.

Testifying Expert in *Capital Credit Alliance v. National Automated Clearing House Association,* concerning electronic checks market.

Testifying Expert for Intel before EC and Korean antitrust authorities on microprocessor markets.

Testifying Expert for AmBev before the EC and Brazilian antitrust authorities on beer market.

Testifying Expert for 1-800-Contacts before the FTC on OSI-CooperVision merger and agreements restraining distribution by nonprescribing retailers.

Testifying Expert in *In Re Cardizem CD Antitrust Litigation*, concerning patents and pharmaceuticals.

Testifying Expert regarding the *B.F. Goodrich-Coltec* Merger, concerning the aerospace industry.

Testifying Expert regarding the *Alcoa-Reynolds* Merger, concerning the aluminum industry

Expert Consultant to National Cable Television Association on Internet Access Bills before Congress and Interactive Television Inquiry before FCC.

Expert for Royal Caribbean for proposed mergers of Princess with Royal Caribbean and Carnival, concerning the cruise industry.

Expert for the Medical Device Manufacturers Association, producing Report to U.S. Senate and Statement to FTC/DOJ regarding exclusionary agreements between medical device suppliers and Group Purchasing Organizations and their hospitals.

EDUCATION

Harvard Law School J.D., June 1986

Awards

Fay Diploma -- for graduating first in class

Sears Prize -- Second Year -- to top two students in class

Sears Prize -- First Year -- to top two students in class

Activities

Harvard Law Review, Articles Office Co-Chair

Class Marshal

Author: *Modes of Analysis: The Theories and Justifications of Privileged Communications*, 98 HARV. L. REV. 1471-1500 (1985).

Harvard College B.A., June 1982

Graduated in three years, majoring in Biochemical Sciences. GPA 3.9

PERSONAL

Born of Argentinian immigrants in New York City. First language was Spanish. Live with wife and 3 children in Newton, Massachusetts.

EXHIBIT B

EINER ELHAUGE STATEMENT OF PUBLICATIONS, PRIOR TRIAL AND DEPOSITION EXPERT TESTIMONY, AND COMPENSATION

I. Publications

My publications from the last 10 years are listed on my CV, which is attached as Exhibit A.

II. Trial and Deposition Expert Testimony

Within the past four years, I have provided deposition testimony as an expert in *In Re Qualcomm Antitrust Litigation* on December 19, 2018; *Roxul USA, Inc. v. Armstrong World Industries, Inc.* on January 14, 2019; *In re Niaspan Antitrust Litigation* on January 31, 2019; *In Re EpiPen (Epinephrine Injection, USP) Marketing Sales Practices and Antitrust Litigation* on February 6, 2019 and December 15, 2019; in *Cameron v. Apple* on July 30, 2021; *In Re Novartis and Par Antitrust Litigation* on December 20, 2021; *In Re Broiler Chicken Antitrust Litigation* on February 15, 2022 and August 26, 2022; *Moehrl v. Nat'l Ass'n of Realtors* on May 18-19, 2022; and *Markson v. CRST International, Inc.* on June 8, 2022.

Within the past four years, I have also testified as an expert at a Daubert Hearing in *Roxul USA, Inc. v. Armstrong World Industries, Inc.* on March 5, 2019, and at a class certification hearing in *In Re EpiPen (Epinephrine Injection, USP) Marketing Sales Practices and Antitrust Litigation* on June 11, 2019.

III. Compensation

I am being compensated at a rate of $1300 per hour for my work on this case, and my consulting firm, Legal Economics LLC, is being compensated $235-745 per hour for the work of my staff on this report.

EXHIBIT C

Damages from Anticompetitively Elevated EndoWrist Prices by Model and Named Plaintiff[981]

Plaintiff		Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health TOTAL	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	173,800	34,760	90,200	18,040
Valley Medical Center	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	55,000	11,000	8,800	1,760
Larkin Community Hospital	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	96,800	19,360	35,200	7,040
Franciscan Health TOTAL	420033	ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420048	ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Valley Medical Center	420048	ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420049	ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	94,000	18,800	66,000	13,200
Valley Medical Center	420049	ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Valley Medical Center	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	63,800	12,760	13,200	2,640
Larkin Community Hospital	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	149,600	29,920	74,800	14,960
Franciscan Health TOTAL	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	206,800	41,360	136,400	27,280
Valley Medical Center	420110	ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420110	ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	83,700	16,740	37,800	7,560
Valley Medical Center	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	38,250	7,650	4,500	900
Franciscan Health TOTAL	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	72,900	14,580	59,400	11,880
Valley Medical Center	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21,600	4,320	0	0
Larkin Community Hospital	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21,600	4,320	0	0
Valley Medical Center	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	192,000	38,400	44,800	8,960
Larkin Community Hospital	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	230,400	46,080	108,800	21,760
Franciscan Health TOTAL	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	531,200	106,240	326,400	65,280
Larkin Community Hospital	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	10,000	2,000	0	0
Valley Medical Center	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	50,000	10,000	38,000	7,600
Franciscan Health TOTAL	420184	ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420189	ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	2,000	400	0	0
Franciscan Health TOTAL	420189	ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	20,000	4,000	16,000	3,200
Franciscan Health TOTAL	420190	ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	19,800	3,960	19,800	3,960
Valley Medical Center	420194	ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420194	ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	83,600	16,720	48,400	9,680
Franciscan Health TOTAL	420203	ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	0	0	0	0
Valley Medical Center	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	143,100	28,620	21,600	4,320
Franciscan Health TOTAL	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	216,000	43,200	137,700	27,540
Larkin Community Hospital	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	116,100	23,220	54,000	10,800
Larkin Community Hospital	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	96,800	19,360	44,000	8,800
Valley Medical Center	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	4,400	880	0	0
Franciscan Health TOTAL	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	-2,200	-440	2,200	440
Larkin Community Hospital	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	17,400	3,480	0	0
Valley Medical Center	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	2,900	580	0	0
Franciscan Health TOTAL	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	75,400	15,080	46,400	9,280
Valley Medical Center	420249	ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420249	ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420278	ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Valley Medical Center	420309	ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	14,400	2,880	0	0
Franciscan Health TOTAL	420309	ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	216,000	43,200	129,600	25,920
Franciscan Health TOTAL	420318	ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420344	ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	428090	ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Valley Medical Center	428090	ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	470001	8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	7,800	1,560	7,800	1,560
Valley Medical Center	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	79,200	15,840	79,200	15,840
Franciscan Health TOTAL	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	342,650	68,530	248,050	49,610
Larkin Community Hospital	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	85,800	17,160	41,800	8,360
Franciscan Health TOTAL	470007	8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	12,000	2,400	12,000	2,400
Franciscan Health TOTAL	470048	8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	28,000	5,600	14,000	2,800
Franciscan Health TOTAL	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	296,100	59,220	224,700	44,940
Valley Medical Center	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71,400	14,280	71,400	14,280
Larkin Community Hospital	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	6,300	1,260	4,200	840
Larkin Community Hospital	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	134,200	26,840	68,200	13,640
Franciscan Health TOTAL	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	435,600	87,120	336,600	67,320
Valley Medical Center	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	94,600	18,920	94,600	18,920
Valley Medical Center	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	27,000	5,400	27,000	5,400
Franciscan Health TOTAL	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	378,000	75,600	283,500	56,700
Valley Medical Center	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	764,800	152,960	764,800	152,960

[981] Source: Intuitive Instrument & Accessory Transaction Data.

Plaintiff		Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Larkin Community Hospital	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	224,000	44,800	108,800	21,760
Franciscan Health TOTAL	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	2,169,600	433,920	1,852,800	370,560
Valley Medical Center	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	17,600	3,520	17,600	3,520
Franciscan Health TOTAL	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	276,400	55,280	228,400	45,680
Larkin Community Hospital	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	6,000	1,200	4,000	800
Franciscan Health TOTAL	470184	8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	223,200	44,640	165,200	33,040
Larkin Community Hospital	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	2,200	440	0	0
Franciscan Health TOTAL	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	74,800	14,960	50,600	10,120
Franciscan Health TOTAL	470194	8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	378,400	75,680	308,000	61,600
Franciscan Health TOTAL	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	664,200	132,840	448,200	89,640
Larkin Community Hospital	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	172,800	34,560	89,100	17,820
Valley Medical Center	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	291,600	58,320	291,600	58,320
Franciscan Health TOTAL	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	28,600	5,720	24,200	4,840
Larkin Community Hospital	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	26,400	5,280	8,800	1,760
Valley Medical Center	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	24,200	4,840	24,200	4,840
Valley Medical Center	470249	8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	35,000	7,000	35,000	7,000
Larkin Community Hospital	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	129,600	25,920	62,400	12,480
Valley Medical Center	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	242,400	48,480	242,400	48,480
Franciscan Health TOTAL	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	62,400	12,480	55,200	11,040
Valley Medical Center	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	86,400	17,280	86,400	17,280
Franciscan Health TOTAL	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	752,400	150,480	529,200	105,840
Franciscan Health TOTAL	470318	8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	86,400	17,280	72,000	14,400
Franciscan Health TOTAL	470344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	48,600	9,720	37,800	7,560
Franciscan Health TOTAL	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	219,300	43,860	219,300	43,860
Valley Medical Center	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	48,450	9,690	48,450	9,690
Valley Medical Center	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	37,800	7,560	37,800	7,560
Franciscan Health TOTAL	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	199,800	39,960	199,800	39,960
Valley Medical Center	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	51,300	10,260	51,300	10,260
Franciscan Health TOTAL	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	251,100	50,220	251,100	50,220
Valley Medical Center	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	9,870	1,974	9,870	1,974
Franciscan Health TOTAL	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	273,070	54,614	273,070	54,614
Franciscan Health TOTAL	471190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	38,880	7,776	38,880	7,776
Valley Medical Center	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	162,400	32,480	162,400	32,480
Franciscan Health TOTAL	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	322,000	64,400	322,000	64,400
Valley Medical Center	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	89,250	17,850	89,250	17,850
Franciscan Health TOTAL	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	28,050	5,610	28,050	5,610
Valley Medical Center	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	65,625	13,125	65,625	13,125
Franciscan Health TOTAL	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	375,375	75,075	375,375	75,075
Franciscan Health TOTAL	471344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7,560	1,512	7,560	1,512
Franciscan Health TOTAL	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	4,500	900	0	0
Larkin Community Hospital	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	7,500	1,500	3,000	600
Franciscan Health TOTAL	TOTAL		da Vinci S/Si	1,841,000	368,200	1,154,300	230,860
Franciscan Health TOTAL	TOTAL		da Vinci X/Xi	7,984,785	1,596,957	6,613,385	1,322,677
Larkin Community Hospital	TOTAL		da Vinci S/Si	778,950	155,790	321,300	64,260
Larkin Community Hospital	TOTAL		da Vinci X/Xi	794,800	158,960	390,300	78,060
Valley Medical Center	TOTAL		da Vinci S/Si	497,200	99,440	88,400	17,680
Valley Medical Center	TOTAL		da Vinci X/Xi	2,198,895	439,779	2,198,895	439,779

EXHIBIT D

Damages from Anticompetitively Elevated EndoWrist Prices by Model for the Proposed Class[982]

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
420001 ASSEMBLY,POTTS SCISSORS,8MM,IS2000	da Vinci S/Si	2,495,575	499,115	1,430,111	286,022
420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	121,345,570	24,269,114	68,789,587	13,757,917
420007 ASSEMBLY,ROUND TIP SCISSORS,8MM,IS2000	da Vinci S/Si	2,176,330	435,266	1,115,629	223,126
420033 ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	1,351,153	270,231	789,976	157,995
420036 ASSEMBLY,DEBAKEY FORCEPS,8MM,IS2000	da Vinci S/Si	1,020,140	204,028	485,720	97,144
420048 ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	5,108,816	1,021,763	2,529,051	505,810
420049 ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	35,582,438	7,116,488	20,018,778	4,003,756
420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	114,603,585	22,920,718	67,563,681	13,512,736
420110 ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	6,012,420	1,202,484	3,253,300	650,660
420121 ASSEMBLY,FINE TISSUE FORCEPS,8MM,IS2000	da Vinci S/Si	111,868	22,374	61,468	12,294
420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	288,000	57,600	184,500	36,900
420171 ASSEMBLY,MICRO BIPOLAR FORCEPS,8MM,IS200	da Vinci S/Si	1,301,423	260,285	761,563	152,313
420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	61,181,706	12,236,341	33,582,671	6,716,534
420178 8MM,CURVED SCISSORS,IS2000	da Vinci S/Si	418,000	83,600	418,000	83,600
420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	303,230,295	60,646,060	178,861,467	35,772,292
420181 ASSEMBLY,RESANO FORCEPS,8MM,IS2000	da Vinci S/Si	371,528	74,306	160,380	32,076
420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	23,622,720	4,724,544	13,423,440	2,684,688
420184 ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	8,617,350	1,723,470	4,697,560	939,512
420189 ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	6,641,920	1,328,384	3,269,130	653,826
420190 ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	3,909,559	781,912	3,909,559	781,912
420192 ASSEMBLY,VALVE HOOK,8MM,IS2000	da Vinci S/Si	48,600	9,720	16,200	3,240
420194 ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	50,473,517	10,094,703	28,855,947	5,771,190
420203 ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	54,896	10,979	32,896	6,579
420204 ASSEMBLY,ATRIAL RETRACTOR,8MM,IS2000	da Vinci S/Si	312,393	62,479	117,250	23,450
420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	140,398,887	28,079,778	82,975,277	16,595,055
420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	7,982,468	1,596,494	4,701,725	940,345
420215 ASSEMBLY,CARDIAC PROBE GRASPER,8MM,IS200	da Vinci S/Si	111,650	22,330	54,450	10,890
420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	51,972,400	10,394,480	27,415,321	5,483,064
420246 ASSEMBLY,ATRIAL RETRACTOR SHORT RIGHT,8M	da Vinci S/Si	564,870	112,974	330,370	66,074
420249 ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	464,035	92,807	222,135	44,427
420278 ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	2,577,812	515,562	1,191,484	238,297
420309 ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	88,375,235	17,675,046	53,422,219	10,684,444
420318 ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	3,644,884	728,977	1,718,364	343,673
420344 ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	2,410,045	482,009	1,107,285	221,457
428090 ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	2,830,995	566,199	999,654	199,931
470001 8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	9,621,152	1,924,230	7,937,192	1,587,438
470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	189,513,968	37,902,792	141,971,858	28,394,372
470007 8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	6,282,578	1,256,516	5,390,713	1,078,143
470033 8MM,BLACK DIAMOND MICRO FORCEPS,IS4000	da Vinci X/Xi	4,757,030	951,406	3,913,150	782,630
470036 8MM,DEBAKEY FORCEPS,IS4000	da Vinci X/Xi	3,457,316	691,463	2,727,506	545,501
470048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	8,251,472	1,650,294	5,935,592	1,187,118
470049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	105,854,309	21,170,862	83,027,089	16,605,418
470093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	186,453,456	37,290,692	144,030,086	28,806,018
470171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	2,676,905	535,381	2,015,505	403,101
470172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	115,068,058	23,013,612	84,762,053	16,952,410
470179 8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	866,197,834	173,239,568	758,302,734	151,660,544
470181 8MM,RESANO FORCEPS,IS4000	da Vinci X/Xi	1,147,400	229,480	969,140	193,828
470183 8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	86,554,410	17,310,882	73,615,810	14,723,162
470184 8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	22,444,803	4,488,961	17,774,323	3,554,865
470190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	9,730,566	1,946,113	7,270,956	1,454,191
470194 8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	100,583,069	20,116,614	86,812,199	17,362,440
470205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	294,100,957	58,820,192	221,532,052	44,306,412

[982] Source: Intuitive Instrument & Accessory Transaction Data.

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
470207 8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	25,109,382	5,021,877	21,446,992	4,289,399
470215 8MM,CARDIAC PROBE GRASPER,IS4000	da Vinci X/Xi	1,300,985	260,197	1,118,585	223,717
470246 8MM,ATRIAL RETRACTOR SHORT RIGHT,IS4000	da Vinci X/Xi	2,724,700	544,940	2,226,720	445,344
470249 8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	3,942,000	788,400	3,259,460	651,892
470296 8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	42,589,716	8,517,943	34,088,616	6,817,723
470309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	171,161,945	34,232,388	136,050,925	27,210,186
470318 8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	41,631,038	8,326,208	33,794,938	6,758,988
470344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	14,931,869	2,986,374	9,968,469	1,993,694
471006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	97,580,218	19,516,044	97,580,218	19,516,044
471048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	2,880,088	576,018	2,880,088	576,018
471049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71,877,471	14,375,494	71,877,471	14,375,494
471093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	106,033,286	21,206,658	106,033,286	21,206,658
471171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	1,750,944	350,189	1,750,944	350,189
471172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	67,364,820	13,472,964	67,364,820	13,472,964
471190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	7,471,859	1,494,372	7,471,859	1,494,372
471205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	153,337,736	30,667,548	153,337,736	30,667,548
471296 8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	26,757,162	5,351,433	26,757,162	5,351,433
471309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	109,601,795	21,920,358	109,601,795	21,920,358
471344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7,976,552	1,595,310	7,976,552	1,595,310
478090 PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	5,485,525	1,097,105	4,089,265	817,853
TOTAL	da Vinci S/Si	1,051,613,083	210,322,618	608,466,148	121,693,227
TOTAL	da Vinci X/Xi	2,974,204,377	594,840,876	2,546,663,861	509,332,773

CORRECTED EXHIBIT E

Suppression of Use Limit Relative to the But-for World[983]

Material Number and Description		Use Limit		Suppression
		Actual	But-for	Percent
		(1)	(2)	(3)=[(2)-(1)]/(2)
420001	ASSEMBLY,POTTS SCISSORS,8MM,IS2000	10	20	50%
420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	10	20	50%
420007	ASSEMBLY,ROUND TIP SCISSORS,8MM,IS2000	10	20	50%
420033	ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	15	20	25%
420036	ASSEMBLY,DEBAKEY FORCEPS,8MM,IS2000	10	20	50%
420048	ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	10	20	50%
420049	ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	10	20	50%
420093	8MM,PROGRASP FORCEPS,IS2000	10	20	50%
420110	ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	10	20	50%
420121	ASSEMBLY,FINE TISSUE FORCEPS,8MM,IS2000	15	20	25%
420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	30	30	0%
420171	ASSEMBLY,MICRO BIPOLAR FORCEPS,8MM,IS200	10	20	50%
420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	10	20	50%
420178	8MM,CURVED SCISSORS,IS2000	10	20	50%
420179	8MM,MONOPOLAR CURVED SCISSORS,IS2000	10	20	50%
420181	ASSEMBLY,RESANO FORCEPS,8MM,IS2000	10	20	50%
420183	8MM,PERMANENT CAUTERY HOOK,IS2000	10	20	50%
420184	ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	10	20	50%
420189	ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	10	20	50%
420190	8MM,COBRA GRASPER,IS2000	10	20	50%
420192	ASSEMBLY,VALVE HOOK,8MM,IS2000	15	20	25%
420194	8MM,MEGA NEEDLE DRIVER,IS2000	10	20	50%
420203	ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	10	20	50%
420204	ASSEMBLY,ATRIAL RETRACTOR,8MM,IS2000	10	20	50%
420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	10	20	50%
420207	8MM,TENACULUM FORCEPS,IS2000	10	20	50%
420215	ASSEMBLY,CARDIAC PROBE GRASPER,8MM,IS200	10	20	50%
420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	10	20	50%
420246	ASSEMBLY,ATRIAL RETRACTOR SHORT RIGHT,8M	10	20	50%
420249	ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	10	20	50%
420278	ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	10	20	50%
420309	ASSEMBLY,MEGASUTURECUT ND,IS2000	10	20	50%
420318	ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	10	20	50%
420344	ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	10	20	50%
428090	ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	10	20	50%
430004	6MM,MONOPOLAR CURVED SCISSORS,SP1098	20	20	0%
430010	6MM,MARYLAND BIPOLAR FORCEPS,SP1098	20	20	0%

[983] Source: Intuitive Instrument & Accessory Transaction Data.

Material Number and Description		Use Limit		Suppression
		Actual	But-for	Percent
		(1)	*(2)*	*(3)=[(2)-(1)]/(2)*
430011	6MM,FENESTRATED BIPOLAR FORCEPS,SP1098	20	20	0%
470001	8MM,POTTS SCISSORS,IS4000	10	20	50%
470006	8MM,LARGE NEEDLE DRIVER,IS4000	10	20	50%
470007	8MM,ROUND TIP SCISSORS,IS4000	10	20	50%
470033	8MM,BLACK DIAMOND MICRO FORCEPS,IS4000	15	20	25%
470036	8MM,DEBAKEY FORCEPS,IS4000	10	20	50%
470048	8MM,LONG TIP FORCEPS,IS4000	10	20	50%
470049	8MM,CADIERE FORCEPS,IS4000	10	20	50%
470093	8MM,PROGRASP FORCEPS,IS4000	10	20	50%
470171	8MM,MICRO BIPOLAR FORCEPS,IS4000	10	20	50%
470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	10	20	50%
470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	10	20	50%
470181	8MM,RESANO FORCEPS,IS4000	10	20	50%
470183	8MM,PERMANENT CAUTERY HOOK,IS4000	10	20	50%
470184	8MM,PERMANENT CAUTERY SPATULA,IS4000	10	20	50%
470190	8MM,COBRA GRASPER,IS4000	10	20	50%
470194	8MM,MEGA NEEDLE DRIVER,IS4000	10	20	50%
470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	10	20	50%
470207	8MM,TENACULUM FORCEPS,IS4000	10	20	50%
470215	8MM,CARDIAC PROBE GRASPER,IS4000	10	20	50%
470246	8MM,ATRIAL RETRACTOR SHORT RIGHT,IS4000	10	20	50%
470249	8MM,DUAL BLADE RETRACTOR,IS4000	10	20	50%
470296	8MM,LARGE SURTURECUT NEEDLE DRIVER,IS4000	10	20	50%
470309	8MM,MEGA SUTURECUT ND,IS4000	10	20	50%
470318	8MM,SMALL GRASPING RETRACTOR,IS4000	10	20	50%
470344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	10	20	50%
471006	8MM,LARGE NEEDLE DRIVER,IS4000	15	20	25%
471048	8MM,LONG TIP FORCEPS,IS4000	18	20	10%
471049	8MM,CADIERE FORCEPS,IS4000	18	20	10%
471093	8MM,PROGRASP FORCEPS,IS4000	18	20	10%
471171	8MM,MICRO BIPOLAR FORCEPS,IS4000	14	20	30%
471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	14	20	30%
471190	8MM,COBRA GRASPER,IS4000	18	20	10%
471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	14	20	30%
471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	15	20	25%
471309	8MM,MEGA SUTURECUT ND,IS4000	15	20	25%
471344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	14	20	30%
478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	10	20	50%

CORRECTED EXHIBIT F

Damages from EndoWrist Use Limit Suppression By Model and Named Plaintiff[984]

Plaintiff	Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health TOTAL	420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	173,800	86,900	90,200	45,100
Larkin Community Hospital	420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	96,800	48,400	35,200	17,600
Valley Medical Center	420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	55,000	27,500	8,800	4,400
Franciscan Health TOTAL	420033 ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420048 ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Valley Medical Center	420048 ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Valley Medical Center	420049 ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420049 ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	94,000	47,000	66,000	33,000
Valley Medical Center	420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	63,800	31,900	13,200	6,600
Larkin Community Hospital	420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	149,600	74,800	74,800	37,400
Franciscan Health TOTAL	420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	206,800	103,400	136,400	68,200
Franciscan Health TOTAL	420110 ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	83,700	41,850	37,800	18,900
Valley Medical Center	420110 ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	38,250	0	4,500	0
Valley Medical Center	420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Valley Medical Center	420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21,600	10,800	0	0
Larkin Community Hospital	420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21,600	10,800	0	0
Franciscan Health TOTAL	420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	72,900	36,450	59,400	29,700
Larkin Community Hospital	420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	230,400	115,200	108,800	54,400
Franciscan Health TOTAL	420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	531,200	265,600	326,400	163,200
Valley Medical Center	420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	192,000	96,000	44,800	22,400
Larkin Community Hospital	420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	10,000	5,000	0	0
Franciscan Health TOTAL	420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	50,000	25,000	38,000	19,000
Valley Medical Center	420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420184 ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420189 ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	2,000	1,000	0	0
Franciscan Health TOTAL	420189 ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	20,000	10,000	16,000	8,000
Franciscan Health TOTAL	420190 ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	19,800	9,900	19,800	9,900
Valley Medical Center	420194 ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420194 ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	83,600	41,800	48,400	24,200
Franciscan Health TOTAL	420203 ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	216,000	108,000	137,700	68,850
Valley Medical Center	420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	143,100	71,550	21,600	10,800
Larkin Community Hospital	420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	116,100	58,050	54,000	27,000
Franciscan Health TOTAL	420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	-2,200	-1,100	2,200	1,100
Valley Medical Center	420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	4,400	2,200	0	0
Larkin Community Hospital	420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	96,800	48,400	44,000	22,000
Franciscan Health TOTAL	420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	75,400	37,700	46,400	23,200
Larkin Community Hospital	420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	17,400	8,700	0	0
Valley Medical Center	420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	2,900	1,450	0	0
Valley Medical Center	420249 ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420249 ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420278 ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420309 ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	216,000	108,000	129,600	64,800
Valley Medical Center	420309 ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	14,400	7,200	0	0
Franciscan Health TOTAL	420318 ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	420344 ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	428090 ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Valley Medical Center	428090 ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Franciscan Health TOTAL	470001 8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	7,800	3,900	7,800	3,900
Larkin Community Hospital	470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	85,800	42,900	41,800	20,900
Valley Medical Center	470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	79,200	39,600	79,200	39,600
Franciscan Health TOTAL	470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	342,650	171,325	248,050	124,025
Franciscan Health TOTAL	470007 8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	12,000	6,000	12,000	6,000

[984] Source: Intuitive Instrument & Accessory Transaction Data.

Plaintiff		Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health TOTAL	470048	8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	28,000	14,000	14,000	7,000
Valley Medical Center	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71,400	35,700	71,400	35,700
Franciscan Health TOTAL	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	296,100	148,050	224,700	112,350
Larkin Community Hospital	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	6,300	3,150	4,200	2,100
Franciscan Health TOTAL	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	435,600	217,800	336,600	168,300
Larkin Community Hospital	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	134,200	67,100	68,200	34,100
Valley Medical Center	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	94,600	47,300	94,600	47,300
Franciscan Health TOTAL	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	378,000	189,000	283,500	141,750
Valley Medical Center	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	27,000	13,500	27,000	13,500
Larkin Community Hospital	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	224,000	112,000	108,800	54,400
Valley Medical Center	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	764,800	382,400	764,800	382,400
Franciscan Health TOTAL	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	2,169,600	1,084,800	1,852,800	926,400
Valley Medical Center	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	17,600	8,800	17,600	8,800
Franciscan Health TOTAL	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	276,400	138,200	228,400	114,200
Larkin Community Hospital	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	6,000	3,000	4,000	2,000
Franciscan Health TOTAL	470184	8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	223,200	111,600	165,200	82,600
Franciscan Health TOTAL	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	74,800	37,400	50,600	25,300
Larkin Community Hospital	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	2,200	1,100	0	0
Franciscan Health TOTAL	470194	8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	378,400	189,200	308,000	154,000
Franciscan Health TOTAL	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	664,200	332,100	448,200	224,100
Larkin Community Hospital	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	172,800	86,400	89,100	44,550
Valley Medical Center	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	291,600	145,800	291,600	145,800
Valley Medical Center	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	24,200	12,100	24,200	12,100
Franciscan Health TOTAL	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	28,600	14,300	24,200	12,100
Larkin Community Hospital	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	26,400	13,200	8,800	4,400
Valley Medical Center	470249	8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	35,000	17,500	35,000	17,500
Valley Medical Center	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	242,400	121,200	242,400	121,200
Franciscan Health TOTAL	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	62,400	31,200	55,200	27,600
Larkin Community Hospital	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	129,600	64,800	62,400	31,200
Franciscan Health TOTAL	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	752,400	376,200	529,200	264,600
Valley Medical Center	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	86,400	43,200	86,400	43,200
Franciscan Health TOTAL	470318	8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	86,400	43,200	72,000	36,000
Franciscan Health TOTAL	470344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	48,600	24,300	37,800	18,900
Franciscan Health TOTAL	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	219,300	54,825	219,300	54,825
Valley Medical Center	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	48,450	12,113	48,450	12,113
Franciscan Health TOTAL	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	199,800	19,980	199,800	19,980
Valley Medical Center	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	37,800	3,780	37,800	3,780
Valley Medical Center	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	51,300	5,130	51,300	5,130
Franciscan Health TOTAL	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	251,100	25,110	251,100	25,110
Valley Medical Center	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	9,870	2,961	9,870	2,961
Franciscan Health TOTAL	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	273,070	81,921	273,070	81,921
Franciscan Health TOTAL	471190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	38,880	3,888	38,880	3,888
Franciscan Health TOTAL	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	322,000	96,600	322,000	96,600
Valley Medical Center	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	162,400	48,720	162,400	48,720
Franciscan Health TOTAL	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	28,050	7,013	28,050	7,013
Valley Medical Center	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	89,250	22,313	89,250	22,313
Franciscan Health TOTAL	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	375,375	93,844	375,375	93,844
Valley Medical Center	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	65,625	16,406	65,625	16,406
Franciscan Health TOTAL	471344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7,560	2,268	7,560	2,268
Franciscan Health TOTAL	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	4,500	2,250	0	0
Larkin Community Hospital	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	7,500	3,750	3,000	1,500
Franciscan Health TOTAL	TOTAL		da Vinci S/Si	1,841,000	920,500	1,154,300	577,150
Franciscan Health TOTAL	TOTAL		da Vinci X/Xi	7,984,785	3,520,273	6,613,385	2,834,573
Larkin Community Hospital	TOTAL		da Vinci S/Si	778,950	370,350	321,300	158,400
Larkin Community Hospital	TOTAL		da Vinci X/Xi	794,800	397,400	390,300	195,150
Valley Medical Center	TOTAL		da Vinci S/Si	497,200	248,600	88,400	44,200
Valley Medical Center	TOTAL		da Vinci X/Xi	2,198,895	978,522	2,198,895	978,522

CORRECTED EXHIBIT G

Damages from EndoWrist Use Limit Suppression By Model for the Proposed Class[985]

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
420001 ASSEMBLY,POTTS SCISSORS,8MM,IS2000	da Vinci S/Si	2,495,575	1,247,788	1,430,111	715,056
420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	121,345,570	60,672,785	68,789,587	34,394,793
420007 ASSEMBLY,ROUND TIP SCISSORS,8MM,IS2000	da Vinci S/Si	2,176,330	1,088,165	1,115,629	557,815
420033 ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	1,351,153	337,788	789,976	197,494
420036 ASSEMBLY,DEBAKEY FORCEPS,8MM,IS2000	da Vinci S/Si	1,020,140	510,070	485,720	242,860
420048 ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	5,108,816	2,554,408	2,529,051	1,264,525
420049 ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	35,582,438	17,791,219	20,018,778	10,009,389
420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	114,603,585	57,301,793	67,563,681	33,781,841
420110 ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	6,012,420	3,006,210	3,253,300	1,626,650
420121 ASSEMBLY,FINE TISSUE FORCEPS,8MM,IS2000	da Vinci S/Si	111,868	27,967	61,468	15,367
420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	288,000	0	184,500	0
420171 ASSEMBLY,MICRO BIPOLAR FORCEPS,8MM,IS200	da Vinci S/Si	1,301,423	650,711	761,563	380,781
420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	61,181,706	30,590,853	33,582,671	16,791,335
420178 8MM,CURVED SCISSORS,IS2000	da Vinci S/Si	418,000	209,000	418,000	209,000
420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	303,230,295	151,615,147	178,861,467	89,430,733
420181 ASSEMBLY,RESANO FORCEPS,8MM,IS2000	da Vinci S/Si	371,528	185,764	160,380	80,190
420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	23,622,720	11,811,360	13,423,440	6,711,720
420184 ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	8,617,350	4,308,675	4,697,560	2,348,780
420189 ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	6,641,920	3,320,960	3,269,130	1,634,565
420190 ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	3,909,559	1,954,779	3,909,559	1,954,779
420192 ASSEMBLY,VALVE HOOK,8MM,IS2000	da Vinci S/Si	48,600	12,150	16,200	4,050
420194 ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	50,473,517	25,236,758	28,855,947	14,427,973
420203 ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	54,896	27,448	32,896	16,448
420204 ASSEMBLY,ATRIAL RETRACTOR,8MM,IS2000	da Vinci S/Si	312,393	156,196	117,250	58,625
420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	140,398,887	70,199,443	82,975,277	41,487,638
420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	7,982,468	3,991,234	4,701,725	2,350,863
420215 ASSEMBLY,CARDIAC PROBE GRASPER,8MM,IS200	da Vinci S/Si	111,650	55,825	54,450	27,225
420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	51,972,400	25,986,200	27,415,321	13,707,660
420246 ASSEMBLY,ATRIAL RETRACTOR SHORT RIGHT,8M	da Vinci S/Si	564,870	282,435	330,370	165,185
420249 ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	464,035	232,017	222,135	111,067
420278 ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	2,577,812	1,288,906	1,191,484	595,742
420309 ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	88,375,235	44,187,617	53,422,219	26,711,109
420318 ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	3,644,884	1,822,442	1,718,364	859,182
420344 ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	2,410,045	1,205,022	1,107,285	553,642
428090 ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	2,830,995	1,415,498	999,654	499,827
470001 8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	9,621,152	4,810,576	7,937,192	3,968,596
470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	189,513,968	94,756,984	141,971,858	70,985,929
470007 8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	6,282,578	3,141,289	5,390,713	2,695,356
470033 8MM,BLACK DIAMOND MICRO FORCEPS,IS4000	da Vinci X/Xi	4,757,030	1,189,258	3,913,150	978,288
470036 8MM,DEBAKEY FORCEPS,IS4000	da Vinci X/Xi	3,457,316	1,728,658	2,727,506	1,363,753
470048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	8,251,472	4,125,736	5,935,592	2,967,796
470049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	105,854,309	52,927,155	83,027,089	41,513,545
470093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	186,453,456	93,226,728	144,030,086	72,015,043
470171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	2,676,905	1,338,453	2,015,505	1,007,753
470172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	115,068,058	57,534,029	84,762,053	42,381,027
470179 8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	866,197,834	433,098,917	758,302,734	379,151,367

[985] Source: Intuitive Instrument & Accessory Transaction Data.

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
470181 8MM,RESANO FORCEPS,IS4000	da Vinci X/Xi	1,147,400	573,700	969,140	484,570
470183 8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	86,554,410	43,277,205	73,615,810	36,807,905
470184 8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	22,444,803	11,222,402	17,774,323	8,887,162
470190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	9,730,566	4,865,283	7,270,956	3,635,478
470194 8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	100,583,069	50,291,534	86,812,199	43,406,099
470205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	294,100,957	147,050,478	221,532,052	110,766,026
470207 8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	25,109,382	12,554,691	21,446,992	10,723,496
470215 8MM,CARDIAC PROBE GRASPER,IS4000	da Vinci X/Xi	1,300,985	650,493	1,118,585	559,293
470246 8MM,ATRIAL RETRACTOR SHORT RIGHT,IS4000	da Vinci X/Xi	2,724,700	1,362,350	2,226,720	1,113,360
470249 8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	3,942,000	1,971,000	3,259,460	1,629,730
470296 8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	42,589,716	21,294,858	34,088,616	17,044,308
470309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	171,161,945	85,580,973	136,050,925	68,025,463
470318 8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	41,631,038	20,815,519	33,794,938	16,897,469
470344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	14,931,869	7,465,935	9,968,469	4,984,235
471006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	97,580,218	24,395,054	97,580,218	24,395,054
471048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	2,880,088	288,009	2,880,088	288,009
471049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71,877,471	7,187,747	71,877,471	7,187,747
471093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	106,033,286	10,603,329	106,033,286	10,603,329
471171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	1,750,944	525,283	1,750,944	525,283
471172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	67,364,820	20,209,447	67,364,820	20,209,447
471190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	7,471,859	747,186	7,471,859	747,186
471205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	153,337,736	46,001,323	153,337,736	46,001,323
471296 8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	26,757,162	6,689,291	26,757,162	6,689,291
471309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	109,601,795	27,400,449	109,601,795	27,400,449
471344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7,976,552	2,392,965	7,976,552	2,392,965
478090 PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	5,485,525	2,742,763	4,089,265	2,044,633
TOTAL	da Vinci S/Si	1,051,613,083	525,284,636	608,466,148	303,923,913
TOTAL	da Vinci X/Xi	2,974,204,377	1,306,037,048	2,546,663,861	1,092,477,760

CORRECTED EXHIBIT H

Damages from Combination of Price Effect and Use Limit Suppression By Model and Named Plaintiff[986]

Plaintiff		Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Larkin Community Hospital	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	96800	58080	35200	21120
Valley Medical Center	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	55000	33000	8800	5280
Franciscan Health	420006	ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	173800	104280	90200	54120
Franciscan Health	420033	ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	0	0	0	0
Valley Medical Center	420048	ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420048	ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420049	ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	94000	56400	66000	39600
Valley Medical Center	420049	ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	206800	124080	136400	81840
Valley Medical Center	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	63800	38280	13200	7920
Larkin Community Hospital	420093	ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	149600	89760	74800	44880
Valley Medical Center	420110	ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	0	0	0	0
Franciscan Health	420110	ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	83700	50220	37800	22680
Franciscan Health	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	38250	7650	4500	900
Valley Medical Center	420157	ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	0	0	0	0
Franciscan Health	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	72900	43740	59400	35640
Valley Medical Center	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21600	12960	0	0
Larkin Community Hospital	420172	ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	21600	12960	0	0
Valley Medical Center	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	192000	115200	44800	26880
Larkin Community Hospital	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	230400	138240	108800	65280
Franciscan Health	420179	ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	531200	318720	326400	195840
Franciscan Health	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	50000	30000	38000	22800
Larkin Community Hospital	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	10000	6000	0	0
Valley Medical Center	420183	ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	0	0	0	0
Franciscan Health	420184	ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420189	ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	2000	1200	0	0
Franciscan Health	420189	ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	20000	12000	16000	9600
Franciscan Health	420190	ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	19800	11880	19800	11880
Valley Medical Center	420194	ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420194	ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	83600	50160	48400	29040
Franciscan Health	420203	ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	0	0	0	0
Larkin Community Hospital	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	116100	69660	54000	32400
Valley Medical Center	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	143100	85860	21600	12960
Franciscan Health	420205	ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	216000	129600	137700	82620
Larkin Community Hospital	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	96800	58080	44000	26400
Franciscan Health	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	-2200	-1320	2200	1320
Valley Medical Center	420207	ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	4400	2640	0	0
Valley Medical Center	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	2900	1740	0	0
Franciscan Health	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	75400	45240	46400	27840
Larkin Community Hospital	420227	ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	17400	10440	0	0
Valley Medical Center	420249	ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420249	ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420278	ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	0	0	0	0
Franciscan Health	420309	ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	216000	129600	129600	77760
Valley Medical Center	420309	ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	14400	8640	0	0
Franciscan Health	420318	ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Franciscan Health	420344	ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	0	0	0	0
Valley Medical Center	428090	ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Franciscan Health	428090	ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	0	0	0	0
Franciscan Health	470001	8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	7800	4680	7800	4680
Franciscan Health	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	342650	205590	248050	148830
Larkin Community Hospital	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	85800	51480	41800	25080
Valley Medical Center	470006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	79200	47520	79200	47520

[986] Source: Intuitive Instrument & Accessory Transaction Data.

Plaintiff	Material Number and Description		System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
Franciscan Health	470007	8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	12000	7200	12000	7200
Franciscan Health	470048	8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	28000	16800	14000	8400
Franciscan Health	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	296100	177660	224700	134820
Larkin Community Hospital	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	6300	3780	4200	2520
Valley Medical Center	470049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71400	42840	71400	42840
Valley Medical Center	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	94600	56760	94600	56760
Franciscan Health	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	435600	261360	336600	201960
Larkin Community Hospital	470093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	134200	80520	68200	40920
Valley Medical Center	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	27000	16200	27000	16200
Franciscan Health	470172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	378000	226800	283500	170100
Franciscan Health	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	2169600	1301760	1852800	1111680
Valley Medical Center	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	764800	458880	764800	458880
Larkin Community Hospital	470179	8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	224000	134400	108800	65280
Larkin Community Hospital	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	6000	3600	4000	2400
Valley Medical Center	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	17600	10560	17600	10560
Franciscan Health	470183	8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	276400	165840	228400	137040
Franciscan Health	470184	8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	223200	133920	165200	99120
Larkin Community Hospital	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	2200	1320	0	0
Franciscan Health	470190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	74800	44880	50600	30360
Franciscan Health	470194	8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	378400	227040	308000	184800
Valley Medical Center	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	291600	174960	291600	174960
Larkin Community Hospital	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	172800	103680	89100	53460
Franciscan Health	470205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	664200	398520	448200	268920
Valley Medical Center	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	24200	14520	24200	14520
Larkin Community Hospital	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	26400	15840	8800	5280
Franciscan Health	470207	8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	28600	17160	24200	14520
Valley Medical Center	470249	8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	35000	21000	35000	21000
Larkin Community Hospital	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	129600	77760	62400	37440
Franciscan Health	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	62400	37440	55200	33120
Valley Medical Center	470296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	242400	145440	242400	145440
Franciscan Health	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	752400	451440	529200	317520
Valley Medical Center	470309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	86400	51840	86400	51840
Franciscan Health	470318	8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	86400	51840	72000	43200
Franciscan Health	470344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	48600	29160	37800	22680
Franciscan Health	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	219300	87720	219300	87720
Valley Medical Center	471006	8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	48450	19380	48450	19380
Franciscan Health	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	199800	55944	199800	55944
Valley Medical Center	471049	8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	37800	10584	37800	10584
Franciscan Health	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	251100	70308	251100	70308
Valley Medical Center	471093	8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	51300	14364	51300	14364
Valley Medical Center	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	9870	4343	9870	4343
Franciscan Health	471172	8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	273070	120151	273070	120151
Franciscan Health	471190	8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	38880	10886	38880	10886
Valley Medical Center	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	162400	71456	162400	71456
Franciscan Health	471205	8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	322000	141680	322000	141680
Valley Medical Center	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	89250	35700	89250	35700
Franciscan Health	471296	8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	28050	11220	28050	11220
Franciscan Health	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	375375	150150	375375	150150
Valley Medical Center	471309	8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	65625	26250	65625	26250
Franciscan Health	471344	8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7560	3326	7560	3326
Franciscan Health	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	4500	2700	0	0
Larkin Community Hospital	478090	PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	7500	4500	3000	1800
Franciscan Health	TOTAL		da Vinci S/Si	1841000	1104600	1154300	692580
Franciscan Health	TOTAL		da Vinci X/Xi	7984785	4413176	6613385	3590336
Larkin Community Hospital	TOTAL		da Vinci S/Si	778950	452070	321300	190980
Larkin Community Hospital	TOTAL		da Vinci X/Xi	794800	476880	390300	234180
Valley Medical Center	TOTAL		da Vinci S/Si	497200	298320	88400	53040
Valley Medical Center	TOTAL		da Vinci X/Xi	2198895	1222597	2198895	1222597

CORRECTED EXHIBIT I

Damages from Combination of Price Effect and Use Limit Suppression By Model for the Proposed Class[987]

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
420001 ASSEMBLY,POTTS SCISSORS,8MM,IS2000	da Vinci S/Si	2,495,575	1,497,345	1,430,111	858,067
420006 ASSEMBLY,LARGE NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	121,345,570	72,807,344	68,789,587	41,273,752
420007 ASSEMBLY,ROUND TIP SCISSORS,8MM,IS2000	da Vinci S/Si	2,176,330	1,305,798	1,115,629	669,378
420033 ASSEMBLY,BLACK DIAMOND MICRO FORCEPS,8MM	da Vinci S/Si	1,351,153	540,461	789,976	315,990
420036 ASSEMBLY,DEBAKEY FORCEPS,8MM,IS2000	da Vinci S/Si	1,020,140	612,084	485,720	291,432
420048 ASSEMBLY,LONG TIP FORCEPS,8MM,IS2000	da Vinci S/Si	5,108,816	3,065,289	2,529,051	1,517,430
420049 ASSEMBLY,CADIERE FORCEPS,8MM,IS2000	da Vinci S/Si	35,582,438	21,349,464	20,018,778	12,011,267
420093 ASSEMBLY,PROGRASP FORCEPS,8MM,IS2000	da Vinci S/Si	114,603,585	68,762,152	67,563,681	40,538,208
420110 ASSEMBLY,PRECISE BIPOLAR FORCEPS,8MM,IS2	da Vinci S/Si	6,012,420	3,607,452	3,253,300	1,951,980
420121 ASSEMBLY,FINE TISSUE FORCEPS,8MM,IS2000	da Vinci S/Si	111,868	44,747	61,468	24,587
420157 ASSEMBLY,SNAP-FIT SCALPEL INSTRUMENT,8MM	da Vinci S/Si	288,000	57,600	184,500	36,900
420171 ASSEMBLY,MICRO BIPOLAR FORCEPS,8MM,IS200	da Vinci S/Si	1,301,423	780,854	761,563	456,938
420172 ASSEMBLY,MARYLAND BIPOLAR FORCEPS,8MM,IS	da Vinci S/Si	61,181,706	36,709,024	33,582,671	20,149,602
420178 8MM,CURVED SCISSORS,IS2000	da Vinci S/Si	418,000	250,800	418,000	250,800
420179 ASSEMBLY,MONOPOLAR CURVED SCISSORS,8MM,I	da Vinci S/Si	303,230,295	181,938,176	178,861,467	107,316,880
420181 ASSEMBLY,RESANO FORCEPS,8MM,IS2000	da Vinci S/Si	371,528	222,917	160,380	96,228
420183 ASSEMBLY,PERMANENT CAUTERY HOOK,8MM,IS20	da Vinci S/Si	23,622,720	14,173,632	13,423,440	8,054,064
420184 ASSEMBLY,PERMANENT CAUTERY SPATULA,8MM,I	da Vinci S/Si	8,617,350	5,170,410	4,697,560	2,818,536
420189 ASSEMBLY,DOUBLE FENESTRATED GRASPER,8MM,	da Vinci S/Si	6,641,920	3,985,152	3,269,130	1,961,478
420190 ASSEMBLY,COBRA GRASPER,8MM,IS2000	da Vinci S/Si	3,909,559	2,345,735	3,909,559	2,345,735
420192 ASSEMBLY,VALVE HOOK,8MM,IS2000	da Vinci S/Si	48,600	19,440	16,200	6,480
420194 ASSEMBLY,MEGA NEEDLE DRIVER,8MM,IS2000	da Vinci S/Si	50,473,517	30,284,110	28,855,947	17,313,568
420203 ASSEMBLY,PERICARDIAL DISSECTOR,8MM,IS200	da Vinci S/Si	54,896	32,938	32,896	19,738
420204 ASSEMBLY,ATRIAL RETRACTOR,8MM,IS2000	da Vinci S/Si	312,393	187,436	117,250	70,350
420205 ASSEMBLY,FENESTRATED BIPOLAR FORCEPS,8MM	da Vinci S/Si	140,398,887	84,239,336	82,975,277	49,785,168
420207 ASSEMBLY,TENACULUM FORCEPS,8MM,IS2000	da Vinci S/Si	7,982,468	4,789,481	4,701,725	2,821,035
420215 ASSEMBLY,CARDIAC PROBE GRASPER,8MM,IS200	da Vinci S/Si	111,650	66,990	54,450	32,670
420227 ASSEMBLY,PK DISSECTING FORCEPS,8MM,IS200	da Vinci S/Si	51,972,400	31,183,440	27,415,321	16,449,193
420246 ASSEMBLY,ATRIAL RETRACTOR SHORT RIGHT,8M	da Vinci S/Si	564,870	338,922	330,370	198,222
420249 ASSEMBLY,DUAL BLADE RETRACTOR,8MM,IS2000	da Vinci S/Si	464,035	278,421	222,135	133,281
420278 ASSEMBLY,GRASPING RETRACTOR,8MM,IS2000	da Vinci S/Si	2,577,812	1,546,687	1,191,484	714,890
420309 ASSEMBLY,MEGASUTURECUT ND,IS2000	da Vinci S/Si	88,375,235	53,025,140	53,422,219	32,053,332
420318 ASSEMBLY,SMALL GRASPING RETRACTOR,8MM,IS	da Vinci S/Si	3,644,884	2,186,931	1,718,364	1,031,018
420344 ASSEMBLY,CURVED BIPOLAR DISSECTOR,8MM,IS	da Vinci S/Si	2,410,045	1,446,027	1,107,285	664,371
428090 ASSEMBLY,PERMANENT CAUTERY HOOK,VESPA2	da Vinci S/Si	2,830,995	1,698,597	999,654	599,792
470001 8MM,POTTS SCISSORS,IS4000	da Vinci X/Xi	9,621,152	5,772,691	7,937,192	4,762,315
470006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	189,513,968	113,708,384	141,971,858	85,183,112
470007 8MM,ROUND TIP SCISSORS,IS4000	da Vinci X/Xi	6,282,578	3,769,547	5,390,713	3,234,428
470033 8MM,BLACK DIAMOND MICRO FORCEPS,IS4000	da Vinci X/Xi	4,757,030	1,902,812	3,913,150	1,565,260
470036 8MM,DEBAKEY FORCEPS,IS4000	da Vinci X/Xi	3,457,316	2,074,390	2,727,506	1,636,504
470048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	8,251,472	4,950,883	5,935,592	3,561,355
470049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	105,854,309	63,512,584	83,027,089	49,816,252
470093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	186,453,456	111,872,072	144,030,086	86,418,048
470171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	2,676,905	1,606,143	2,015,505	1,209,303
470172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	115,068,058	69,040,832	84,762,053	50,857,232
470179 8MM,MONOPOLAR CURVED SCISSORS,IS4000	da Vinci X/Xi	866,197,834	519,718,688	758,302,734	454,981,632
470181 8MM,RESANO FORCEPS,IS4000	da Vinci X/Xi	1,147,400	688,440	969,140	581,484
470183 8MM,PERMANENT CAUTERY HOOK,IS4000	da Vinci X/Xi	86,554,410	51,932,644	73,615,810	44,169,484
470184 8MM,PERMANENT CAUTERY SPATULA,IS4000	da Vinci X/Xi	22,444,803	13,466,882	17,774,323	10,664,594
470190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	9,730,566	5,838,340	7,270,956	4,362,574
470194 8MM,MEGA NEEDLE DRIVER,IS4000	da Vinci X/Xi	100,583,069	60,349,840	86,812,199	52,087,320
470205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	294,100,957	176,460,576	221,532,052	132,919,232
470207 8MM,TENACULUM FORCEPS,IS4000	da Vinci X/Xi	25,109,382	15,065,629	21,446,992	12,868,195

[987] Source: Intuitive Instrument & Accessory Transaction Data.

Material Number and Description	System	Total Sales With But-For Entry 5/21/2017	Damages With But-For Entry 5/21/2017	Total Sales With But-For Entry 7/11/2018	Damages With But-For Entry 7/11/2018
470215 8MM,CARDIAC PROBE GRASPER,IS4000	da Vinci X/Xi	1,300,985	780,591	1,118,585	671,151
470246 8MM,ATRIAL RETRACTOR SHORT RIGHT,IS4000	da Vinci X/Xi	2,724,700	1,634,820	2,226,720	1,336,032
470249 8MM,DUAL BLADE RETRACTOR,IS4000	da Vinci X/Xi	3,942,000	2,365,200	3,259,460	1,955,676
470296 8MM,LARGE SURTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	42,589,716	25,553,830	34,088,616	20,453,170
470309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	171,161,945	102,697,168	136,050,925	81,630,552
470318 8MM,SMALL GRASPING RETRACTOR,IS4000	da Vinci X/Xi	41,631,038	24,978,622	33,794,938	20,276,962
470344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	14,931,869	8,959,121	9,968,469	5,981,082
471006 8MM,LARGE NEEDLE DRIVER,IS4000	da Vinci X/Xi	97,580,218	39,032,088	97,580,218	39,032,088
471048 8MM,LONG TIP FORCEPS,IS4000	da Vinci X/Xi	2,880,088	806,425	2,880,088	806,425
471049 8MM,CADIERE FORCEPS,IS4000	da Vinci X/Xi	71,877,471	20,125,692	71,877,471	20,125,692
471093 8MM,PROGRASP FORCEPS,IS4000	da Vinci X/Xi	106,033,286	29,689,320	106,033,286	29,689,320
471171 8MM,MICRO BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	1,750,944	770,415	1,750,944	770,415
471172 8MM,MARYLAND BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	67,364,820	29,640,522	67,364,820	29,640,522
471190 8MM,COBRA GRASPER,IS4000	da Vinci X/Xi	7,471,859	2,092,121	7,471,859	2,092,121
471205 8MM,FENESTRATED BIPOLAR FORCEPS,IS4000	da Vinci X/Xi	153,337,736	67,468,608	153,337,736	67,468,608
471296 8MM,LARGE SUTURECUT NEEDLE DRIVER,IS4000	da Vinci X/Xi	26,757,162	10,702,865	26,757,162	10,702,865
471309 8MM,MEGA SUTURECUT ND,IS4000	da Vinci X/Xi	109,601,795	43,840,716	109,601,795	43,840,716
471344 8MM,CURVED BIPOLAR DISSECTOR,IS4000	da Vinci X/Xi	7,976,552	3,509,683	7,976,552	3,509,683
478090 PERMANENT CAUTERY HOOK,SINGLE-SITE,IS400	da Vinci X/Xi	5,485,525	3,291,315	4,089,265	2,453,559
TOTAL	da Vinci S/Si	1,051,613,083	630,550,332	608,466,148	364,832,362
TOTAL	da Vinci X/Xi	2,974,204,377	1,639,670,498	2,546,663,861	1,383,314,961